PVP

PAINT and VARNISH PRODUCTION

STEEL PAILS and DRUMS

A Size and Style for Every Requirement!

ALL from ONE DEPENDABLE SOURCE
COMPETITIVELY PRICED

- ALL SIZES — Pails, 1 through 13 gallons; Drums, 13 through 65 gallons.
- Closed Head or Open Head. Plain Pouring Nozzles or Specified Spouts. Bolted or Lever Closures.
- Sturdy, Dent-Resistant, V-shaped Rolling Hoops. Deep, Strong, 5-ply Chimes. Rugged Fusion-Welded Seams.
- Baked-on Protective finishes. Pails and Drums beautifully Lithographed. Large Drums custom painted and printed.
- Quick delivery from stocked warehouses or "ready" pickup by Customer's trucks.

At no obligation . . . consult our staff on your packaging problems. We furnish special sizes and special gauge containers on request.

Write, wire, phone for Samples, Prices.

HI-BAKE LININGS

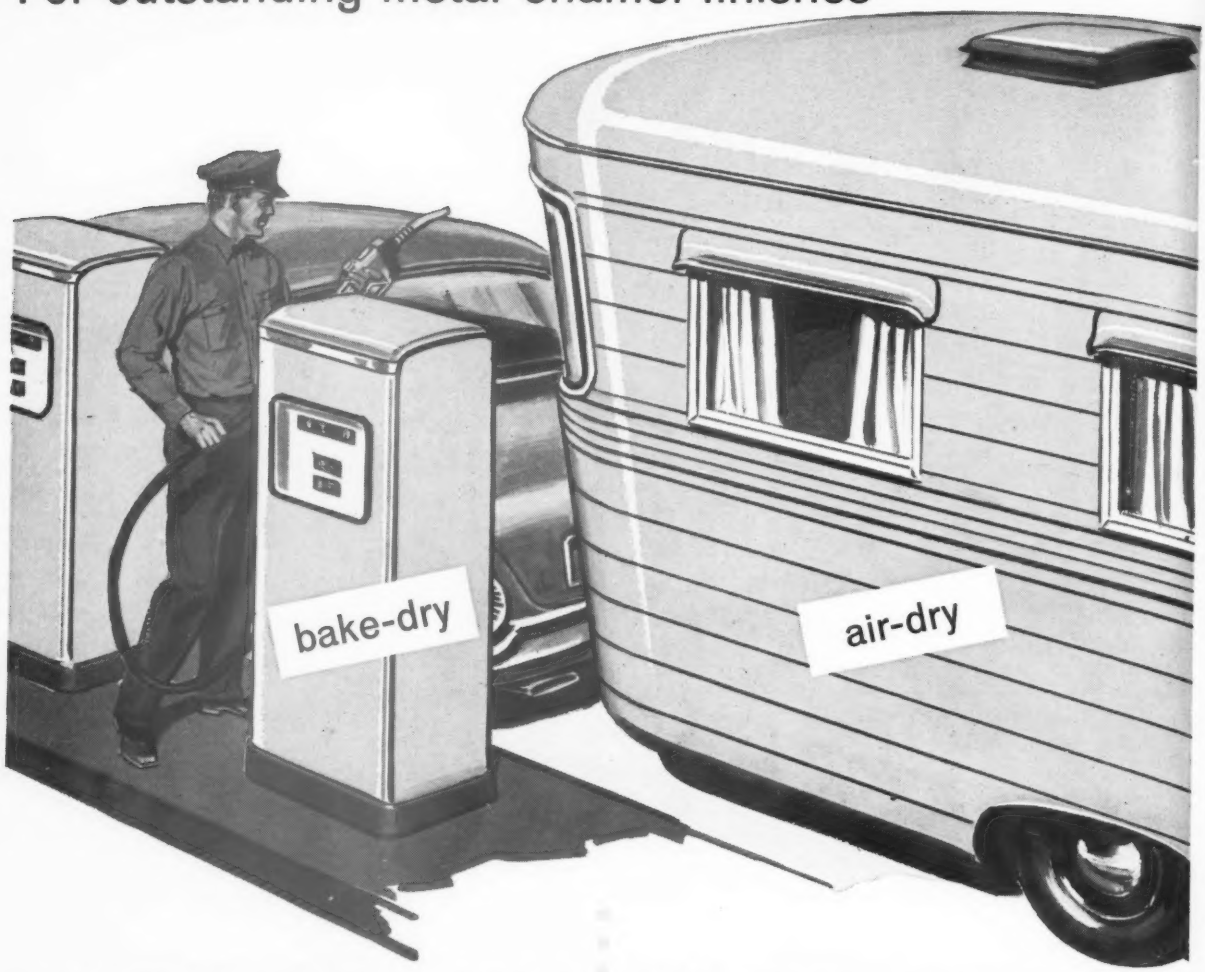
- time-tested
- perfect fusion . . . ful surface coverage . . . proper, uniform film thickness
- proven - in - use fo hard - to - hold pro ucts . . .

VULCAN STEEL CONTAINER CO.

Main Office and Factory

315 35th AVE., N. • P. O. BOX 786 • BIRMINGHAM, ALABAMA

For outstanding metal-enamel finishes



RCI LUSTRASOL 4290

...a baking acrylic copolymer with unique conversion properties, LUSTRASOL 4290:

- cures to Sward hardness of 26-32% in 30 min. @ 250°F.
- will not discolor even when overbaked at 350°F.
- yields *one-coat metal finishes* with excellent chemical resistance and good durability

An enamel vehicle for quality top coats — for exterior and interior finishes, it exhibits good resistance to weathering.

RCI LUSTRASOL 4281

...an alkyd modified acrylic for formulating exterior air-dry metal finishes, LUSTRASOL 4281:

- air-dries hard in 30 min. @ 77°F.
- has good gloss, gloss retention, hardness
- has exceptional exterior durability and resistance to water, alkali and soap for an air-dry material

Intended for original as well as repaint exterior finishes — it shows good resistance to rain, sun, cold, etc.

Write for further data, samples, and starting formulae on LUSTRASOL 4290 and LUSTRASOL 4281

REICHHOLD

Synthetic Resins • Chemical Colors • Industrial Adhesives • Phenol
Hydrochloric Acid • Formaldehyde • Phthalic Anhydride • Maleic Anhydride
Ortho-Phenylphenol • Sodium Sulfite • Pentaerythritol • Pentachlorophenol
Sodium Pentachlorophenate • Sulfuric Acid • Methanol

Creative Chemistry... Your Partner in Progress

RCI

REICHHOLD CHEMICALS, INC.,
RCI BUILDING, WHITE PLAINS, N. Y.

Paint formulators:

Now...with new H-1 and H-2 curing agents you can offer...

- ✓ 100% Epon® resin finishes.
- ✓ Applied with standard spray equipment.
- ✓ In coats 10 mils thick!

Hard to believe? Let us tell you the whole story on H-1 and H-2 curing agents. Call or write your nearest Shell Chemical district office.

SHELL CHEMICAL COMPANY
PLASTICS AND RESINS DIVISION

Central District
6054 West Touhy Avenue
Chicago 48, Illinois

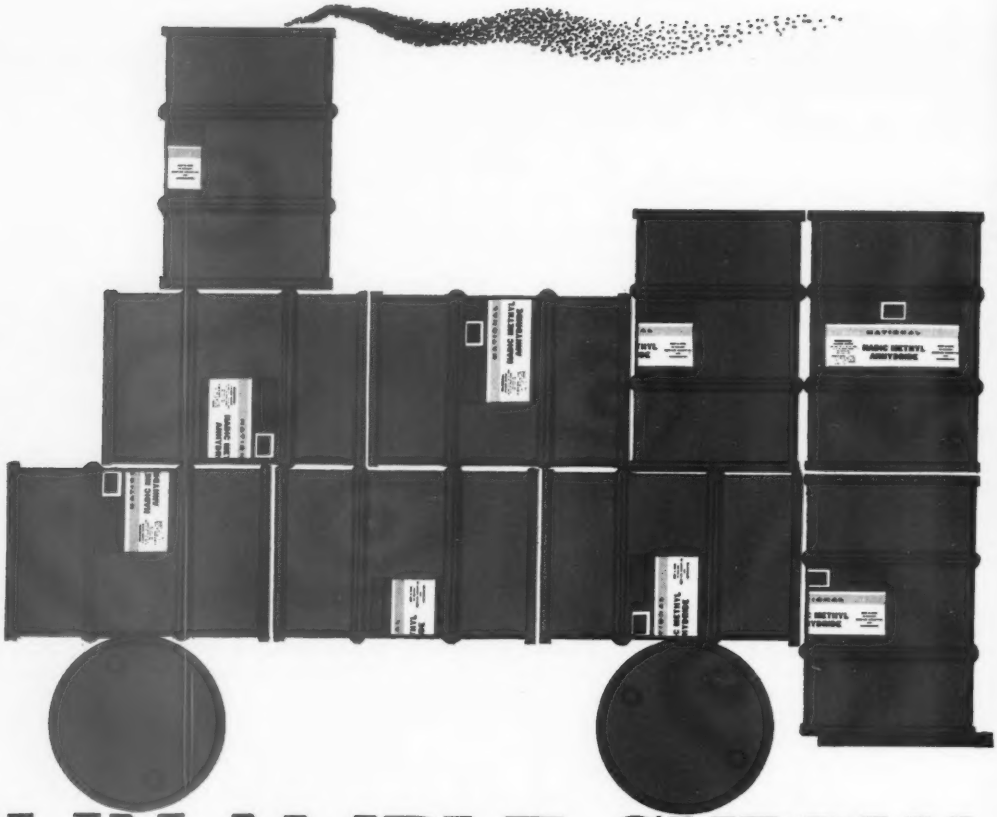
East Central District
20575 Center Ridge Road
Cleveland 16, Ohio

Eastern District
42-76 Main Street
Flushing 55, New York

Western District
10642 Downey Avenue
Downey, California

IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited, Toronto

SHELL



NOW IN AMPLE SUPPLY

NADIC® Methyl Anhydride

NATIONAL ANILINE DIVISION
40 RECTOR STREET, NEW YORK 6, N. Y.
Atlanta Boston Charlotte Chicago Greensboro Los Angeles
Philadelphia Portland, Ore. Providence San Francisco
In Canada: ALLIED CHEMICAL CANADA, LTD., 100 North Queen St., Toronto 18
Distributors throughout the world. For information:
ALLIED CHEMICAL INTERNATIONAL • 40 Rector St., New York 6, N. Y.

Allied Chemical

PVP
PAINT and VARNISH PRODUCTION

(REG. U.S. PATENT OFFICE)

JUNE 1960

Formerly PAINT and VARNISH PRODUCTION MANAGER
(Established in 1910 as The Paint and Varnish Record)

VOLUME 50
NO. 7

COPYRIGHT © 1960 PUBLISHED BY POWELL MAGAZINES, INC., EXECUTIVE AND EDITORIAL OFFICES, 855 AVE. OF THE AMERICAS, NEW YORK 1, N. Y. BRyant 9-0497

FEATURES

ASTM Committee D-1 on Paint, Varnish, and Lacquer, *by Walter A. Gloger* 33

The Blister Box Grows Up, *by William Scheufele* 37
Use of emulsion paints for exterior application has spurred the need for large scale testing.

Measuring Paint Thickness Using the Electronic Method 39
Non-destructive technique gives quick and accurate readings.

Bonding of Exterior Latex House Paints to Chalky Wood Surfaces, *by Temple C. Patton* 43
Drying oil additive shows promise in enhancing the adhesion of emulsion paints to wood surfaces.

The Coating Corner, *by Edward Anthony* 51

FOREIGN DEVELOPMENTS

12th OCCA Exhibit Features Water-Soluble Resins, Colored Titanium Pigments, and Polyesters 59

Montecatini Plans Modern Paint Plant 65

PRODUCTION

The Break-Even Point—A Control Technique, *by Lawrence Shatkin* ... 71

New Equipment and Raw Materials 81

Patents 86

Technical Bulletins 89

AEROSOL COATINGS

Problems in the Filling of Aerosol Paints, *by E. G. Roberts* 95
Both cold and pressure filling methods are discussed and compared.

Recent Developments in the Paint Aerosol Field 99

DEPARTMENTS

Comment 7

News 105

Calendar of Events 111

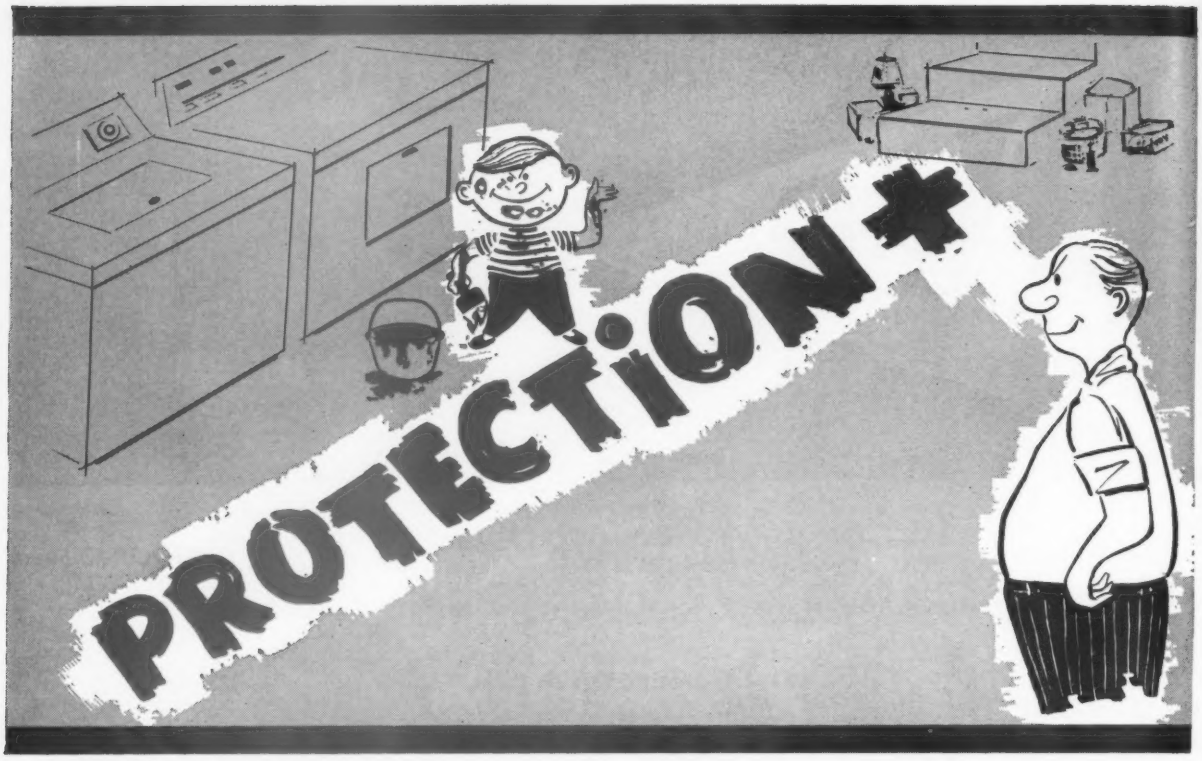
Personnel Changes 112

In Our 50th Year

NEXT ISSUE

The preparation of varnish and varnish type vehicles containing tung oil will be featured in our July issue. A cost analysis for the manufacture of tung oil—resin varnish vehicles will also be covered in detail.

PAINT and VARNISH PRODUCTION is published monthly except semi-monthly in March at Easton, Pa., by Powell Magazines, Inc., John Powell, president; Ira P. MacNair, vice-president and treasurer; Alan P. Danforth, vice-president; Alice L. Lynch, secretary. Entered as second class matter at Post Office at Easton, Pa., Jan. 30th, 1952, under the Act of March 3, 1879. SUBSCRIPTION RATES POSTPAID: *United States and Canada*, 1 year $4.00; 2 years $7.00. *Mexico and Pan-American Countries*, 1 year $5.00; 2 years $8.00. All other countries, 1 year $8.00; 2 years $15.00. Remit cash in advance, with order, by bankers draft on New York funds. SINGLE COPIES: *Current issue:* $0.50; *all back numbers:* $1.00. Convention issue: $1.00. Review and Buyers' Guide: $5.00. Bound volumes: $15.00 per vol. when available. We cannot guarantee to supply back numbers and claims for missing numbers cannot be granted if received more than 60 days after date of mailing. Subscribers should promptly notify circulation department of any change in address, giving both old and new addresses and by sending address label. EDITORIAL AND EXECUTIVE OFFICES: 855 Avenue of the Americas, New York 1, N. Y. BRyant 9-0497. Printed in U. S. A.



NOW! **OFFER "PROTECTION-PLUS" IN CONCRETE FLOOR PAINT MADE WITH**

MARBON 9200®

Soluble High Styrene Paint Resin

- *Resists acid*
- *Resists alkali*
- *Not harmed by oil or grease*
- *Bars water vapor*
- *Dries rapidly*
- *Permits wide range of colors, flexibilities, and degrees of hardness*

Paint made with Marbon 9200 gives concrete floors full protection against acids, fumes, weather and water —*plus* superior brush-on qualities, better coverage, and controlled drying. Marbon 9200 gives an attractive gloss too, and builds a tough film that takes the heaviest traffic in stride. These are all reasons why paints containing Marbon 9200 can do a bang-up job of helping to build your sales.

Marbon 9200 is a unique type of binder that provides long package stability. It is specially designed for simple cold-set stir-in when making all types of paints, from clear lacquer to semi-flat. No cooking equipment needed. Production is fast and economical —to help you keep your prices attractively low.

Get the facts—write today for complete information

MARBON CHEMICAL
WASHINGTON

MARBON CHEMICAL BW BORG WARNER

DIVISION **BORG-WARNER**
WEST VIRGINIA

EDITORIAL COMMENT

Employee Suggestions Pay Off

RECENTLY, a paint batch loader in one of our leading paint companies came up with an idea on how to make more paint in less time. He suggested reducing the quantity of pebbles used in the mill when processing batches of paint. By adopting his suggestion, the company found that the quality of the paint was not affected, but more paint could be loaded in each batch while unloading time was reduced. For this suggestion the worker was awarded 400 dollars.

Undoubtedly, similar suggestions have paid off handsomely for many other paint firms. Moreover the awards given to employees for their suggestions and ideas have been tremendous morale builders. It goes without saying that an employee whose company interest is stimulated to suggest improvements becomes a proficient worker.

However, for a suggestion system to become effective it must be properly run. Some recognized channel for making suggestions must be organized within the plant. Often times a worker may have some good ideas of improving production or saving time and raw materials, but is reluctant to make any suggestions because there are no recognized authorities to whom he may bring his ideas. For an employee suggestion system to be effective, the Small Business Administration advises the inclusion of the following elements:

"1. Some way—for instance, a suggestion box—to solicit and obtain ideas from employees.

2. Some way—usually through a committee—to evaluate the ideas.

3. Some way to provide suitable recognition and rewards for ideas that are accepted and suitable explanation for those that are not.

4. Some way to follow up to see that good ideas are put to use, either immediately or whenever changing conditions make them applicable."

These four elements can form the basis for an effective suggestion system plan for any firm.

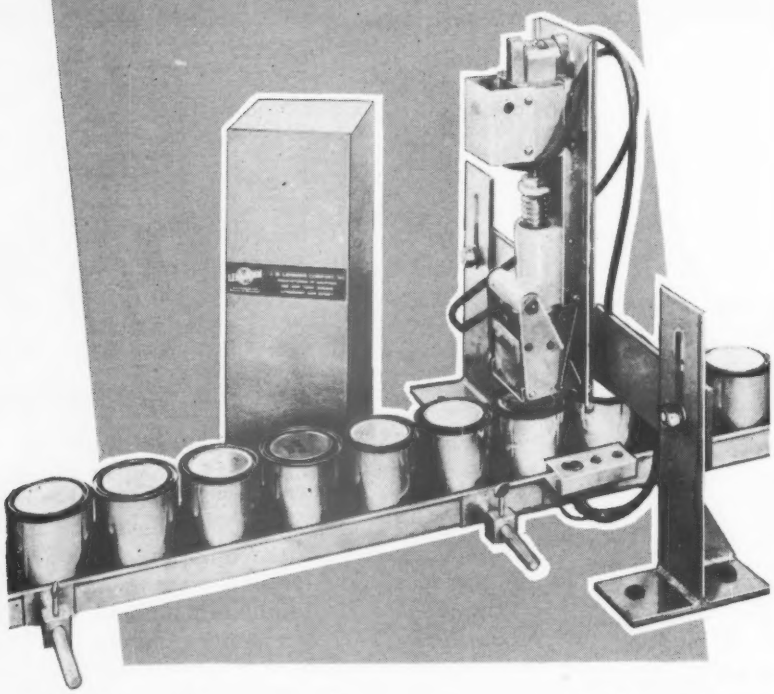
A word about awards. The Small Business Administration advises that the more generous the awards, the more effective the system and the greater the savings in the long run. Cash awards are the most popular and there should be no maximum award. A minimum amount should be established. There are many ramifications as to the amount the company awards the employee for his suggestion. Generally, these are based on percentage of the savings involved. Experience shows that big cash awards creates more interest in the company's suggestion plan with the result that the volume of ideas rises considerably.

Remember the worker in your plant knows the details of his job better than anyone else including his supervisors. Thus he is in the position to come up with ideas on how to improve his job which can mean savings in the operation of your plant. And it is because of this job familiarity that the suggestion system has been a source for many ideas on plant safety. Countless hazards including fire have been either eliminated or minimized through an employee's suggestion.

Any suggestion plan requires continued promotion by management to keep the employees interested. One effective means has been the publicizing of a big award through the company's house organ or weekly paper.

Suggestion plans more than pay their own way. Do you have an effective one which is paying you dividends in plant efficiency and safety?

The LEHMANN CAN CODING MACHINE



marks them faster and better

The Lehmann Automatic Can and Package Coding Machine marks sixty cans per minute with a clean-cut permanent code mark. It uses a special opaque quick-drying ink that is not affected by the thin film of oil sometimes present on can lids.

The machine prints on tops or bottoms of cans or packages moving in any direction. It prints on cans of slightly different heights without adjustment. It stamps the code on containers in motion, without smearing.

The Lehmann Coding Machine fits on all types of can and package closing machines. It handles containers 1/32 to 1 gallon and prints up to 3 lines of 12 characters each. The machine is available in any voltage or air specifications.

Send for further information

LEHMANN ®
world renowned in processing machinery

J. M. LEHMANN COMPANY, Inc.

550 New York Avenue, Lyndhurst, New Jersey

PVP

Serving Administration and Technical-Production Management of Coatings Manufacturing Plants

Published monthly by
POWELL MAGAZINES, INC.
855 Ave. of the Americas
New York 1, N. Y.
BRyant 9-0497

PUBLISHER
JOHN POWELL

EDITOR
ANTHONY ERRICO

EDITORIAL STAFF
Marvin C. Feinstein, *Assistant Editor*
J. P. Danforth, *Art Editor*
Lawrence Shatkin, *Production*
Vladimir Slamecka, *Foreign*
E. G. Roberts, *Aerosol Coatings*
W. Philip Leidy, *Editorial Assistant*

BUSINESS STAFF
Alan P. Danforth, *General Manager*
Abraham Mann, *Production Manager*
Harold C. Kinnaman, Jr., *Circulation Manager*
K. Elaine Mullin *Advertising Service*

ADVERTISING SALES STAFF
Philip J. Seavey, *Advertising Manager*

New York
Powell Magazines Inc., 855 Ave. of the Americas, New York 1, N. Y. BRyant 9-0497

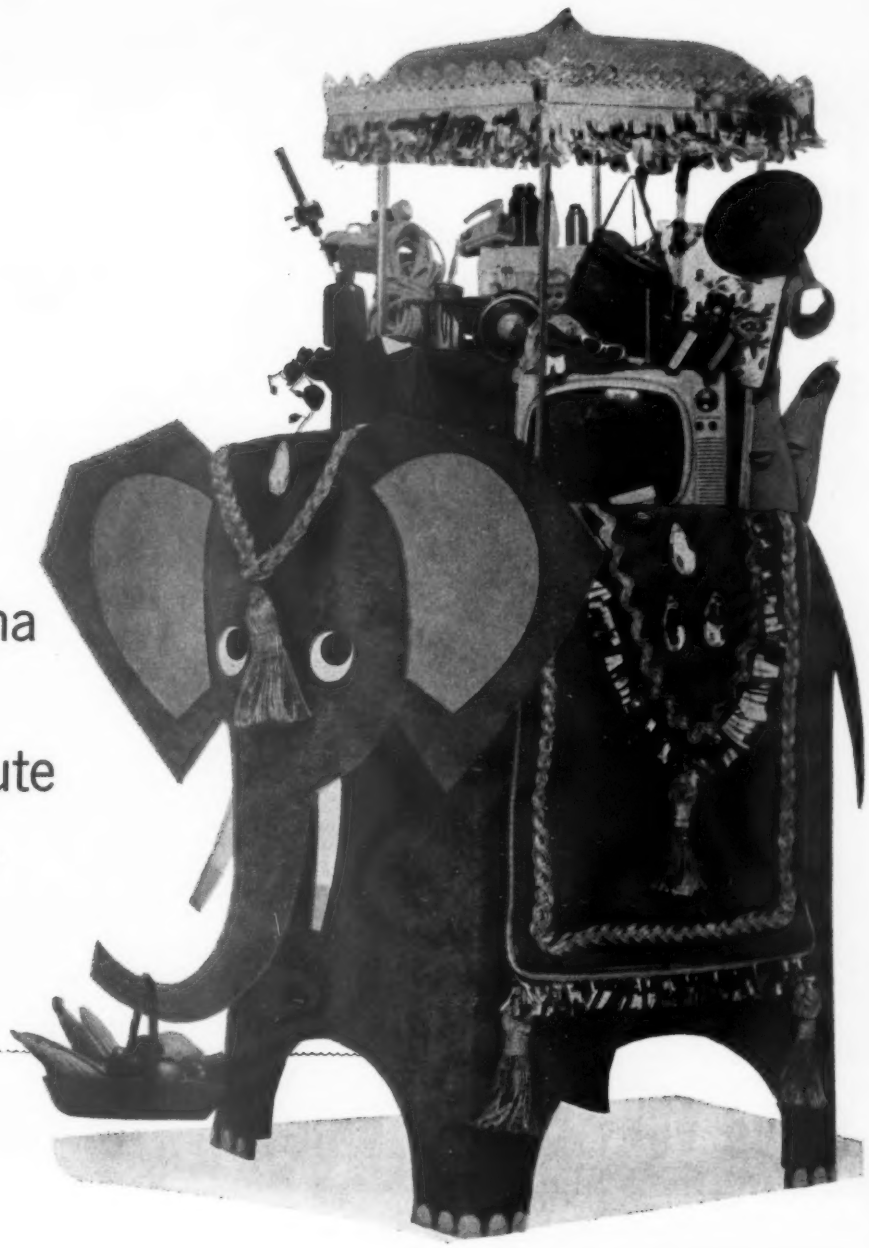
Chicago
William Cook, Russell Henriquez, c/o W. A. Cook & Associates, 161 E. Grand Ave., Chicago 11, Ill. SUperior 7-9420

West Coast
San Francisco: Morton McDonald, c/o McDonald-Thompson Company, 625 Market St., San Francisco 5, Calif. YUkon 1-2245

Branch Offices of McDonald-Thompson Co.—Los Angeles, Calif., Denver, Colo., Portland, Ore., Seattle, Wash., Houston, Tex., and Dallas, Tex.

MEMBER BUSINESS
BPA
PUBLICATIONS AUDIT, INC

Vasco da Gama sailed an uncharted route



Vasco da Gama's route to the wealth of the East was uncharted. But when it comes to chemicals, you can steer a sure course to better, more uniform products when you use high quality Sinclair solvents.

Sinclair aromatic, aliphatic and odorless solvents set industry's standards for quality. These Sinclair solvents are available from nearby supply points–in the type of transportation equipment you require.

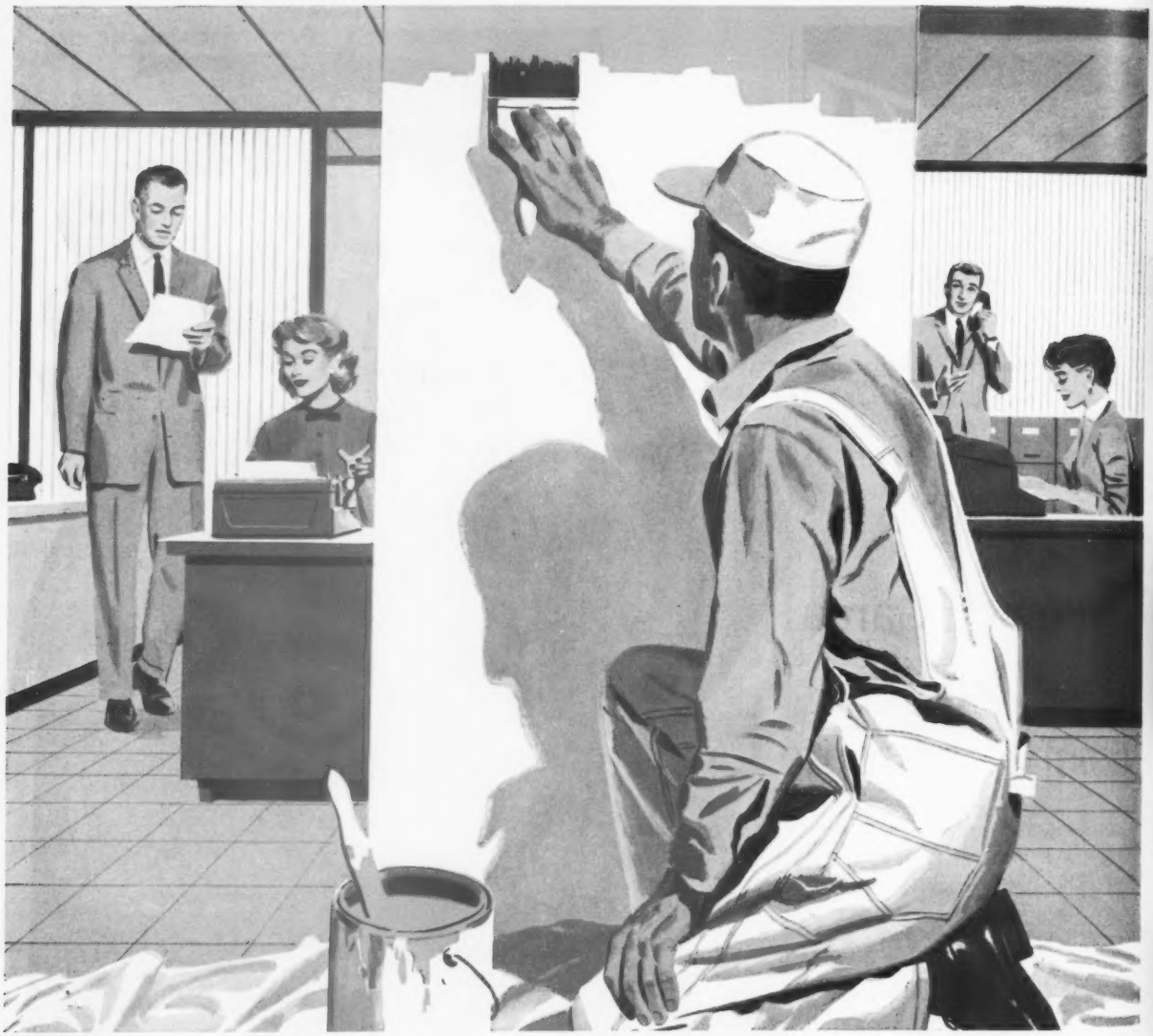
To guard against contamination, Sinclair ships aromatic, aliphatic and odorless solvents in three separate tank car fleets used exclusively for this purpose. For prompt, dependable deliveries, write or call . . .

SINCLAIR PETROCHEMICALS, INC.

Subsidiary of Sinclair Oil Corporation, 600 Fifth Avenue, New York 20, N.Y.

PARAXYLENE (98%) • PROPYLENE (99+%) • DURENE (1,2,4,5-TETRAMETHYLBENZENE) • ANHYDROUS AMMONIA • AMMONIUM NITRATE SOLUTIONS • AQUA AMMONIA • NITROGEN FERTILIZER SOLUTIONS • ALIPHATIC SOLVENTS • ODORLESS SOLVENTS • AROMATIC SOLVENTS • HEAVY AROMATIC SOLVENT TOLUENE (NITRATION GRADE) • XYLENE (FIVE DEGREE) • SULFUR • SULFONATES (OIL SOLUBLE) • CORROSION INHIBITORS • LUBE OIL ADDITIVES

Sinclair



Solve your odor problems with Shell Solvents

You'll sell more paint with these solvents . . . preferred for low odor and odorless products.

Shell Sol 71 and 72 . . . have no odor, are ideal for interior finishes, polishes and cleaners. Shell Sol 71 offers slightly faster evaporation.

Shell Sol 360 . . . much faster evaporation than mineral spirits, low odor, over 100°F. flash point.

Shell Sol 140 . . . a high-flash, slower drying solvent with unusually low odor.

Shell Mineral Spirits . . . traditional distillation range, solvent power and drying. Mild odor.

Typical properties of these Shell Solvents are contained in booklet shown. It will be mailed on request.

FACT—FROM SHELL RESEARCH

Odor stability is important.

SHELL OIL COMPANY

50 WEST 50TH STREET, NEW YORK 20, NEW YORK
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

Testing Gen-Flo in formulations using standard pebble mills.

GEN-FLO® has uniform quality ... batch after batch

Gen-Flo, the balanced styrene-butadiene latex, has gained tremendous acceptance by quality-conscious paint manufacturers everywhere! This acceptance is based on Gen-Flo's many superior characteristics, and on its uniform quality, batch after batch. Completely interchangeable with other high quality latices, Gen-Flo helps reduce inventory investment, while making paint production easier and more economical. When you order Gen-Flo, you're assured of prompt, "Tailored-to-your-needs" delivery. Write today for formulation suggestions and technical data.

THE GENERAL TIRE & RUBBER COMPANY
CHEMICAL DIVISION • AKRON, OHIO

Chemicals for the rubber, paint, paper, textile, plastics and other industries. **GENTRO SBR** *rubber* **GENTRO-JET** *black masterbatch* • **GEN-FLO** *styrene-butadiene latices* • **GEN-TAC** *vinyl pyridine latex* • **GENTHANE** *polyurethane elastomer* • **ACRI-FLO** *styrene-acrylic latices* • **VYGEN PVC** *resins* • **KURE-BLEND** TMTD *masterbatch* • **KO-BLEND** *insoluble sulfur masterbatch*

GEN-FLO®

balanced to assure maximum

Freeze-thaw stability
Scrubbability
Cleansability
Interchangeability
Mechanical stability

Creating Progress Through Chemistry

Chemical Division **GENERAL**
THE GENERAL TIRE & RUBBER CO.

BUTADIENE • A high purity diolefin, it gives top quality to latex paints. It fulfills the most rigid requirements for purity and uniformity . . . helps water emulsion paints roll on smoothly, evenly, and easily.

DICYCLOPENTADIENE • As an extender for drying oils in varnish manufacture, it reduces the cost of the finished product. As a modifier for semi-drying oils, it upgrades them by approaching drying oils in reaction and drying time.

METHYL ETHYL KETONE is a solvent used in the manufacture of many lacquers and shellacs. It assures durable surface coatings for fine furniture. Of high purity and low acidity, it provides maximum solvent power at minimum cost.

TECHNICAL ASSISTANCE • At the Enjay Buton testing laboratory the most modern equipment and methods are always at work to help customers in the solution of technical problems and new product applications.

ANOTHER FIRST FROM ENJAY FOR BETTER

ENJAY
PETROCHEMICALS

Helping drum up more sales for surface coatings manufacturers has always been a prime consideration of the Enjay Company. And now, added to the line of these quality petrochemicals . . . BUTON RESINS – formerly called C-Oil and Butoxy Resins. These resins offer tough, high-quality coatings comparable to those obtained from higher-priced materials. They may be cured by air dry – force dry cycles, low-temperature bakes, high-temperature bakes, or a new technique called flame curing. Flame curing produces the tough, chemically resistant finish 20 to 50 times faster than conventional bake cycles.

Buton Resins offer multiple advantages. They can be blended with ureas, melamines, short and medium oil alkyds, vinyls, phenolics and

SURFACE COATINGS...BUTON RESINS

nitrocellulose to obtain specific properties. They provide adhesion on various substrata, high gloss, good pigment wetting, and good corrosion and chemical resistance. Buton Resins can be used in primer formulations for appliances, automobiles, and all types of metals. They can be formulated for use in container linings, finishes for furniture, wire coatings, etc. For technical assistance or to order Buton Resins, contact your nearest Enjay office. *Trademark

EXCITING NEW PRODUCTS THROUGH PETRO-CHEMISTRY

ENJAY CHEMICAL COMPANY

A DIVISION OF HUMBLE OIL & REFINING COMPANY

HOME OFFICE:
15 West 51st Street, New York 19, N. Y.

OTHER OFFICES:

Akron	*Boston*	*Charlotte*
Chicago	*Detroit*	*Houston*
Los Angeles	*New Orleans*	*Tulsa*

ENJAY
PETROCHEMICALS

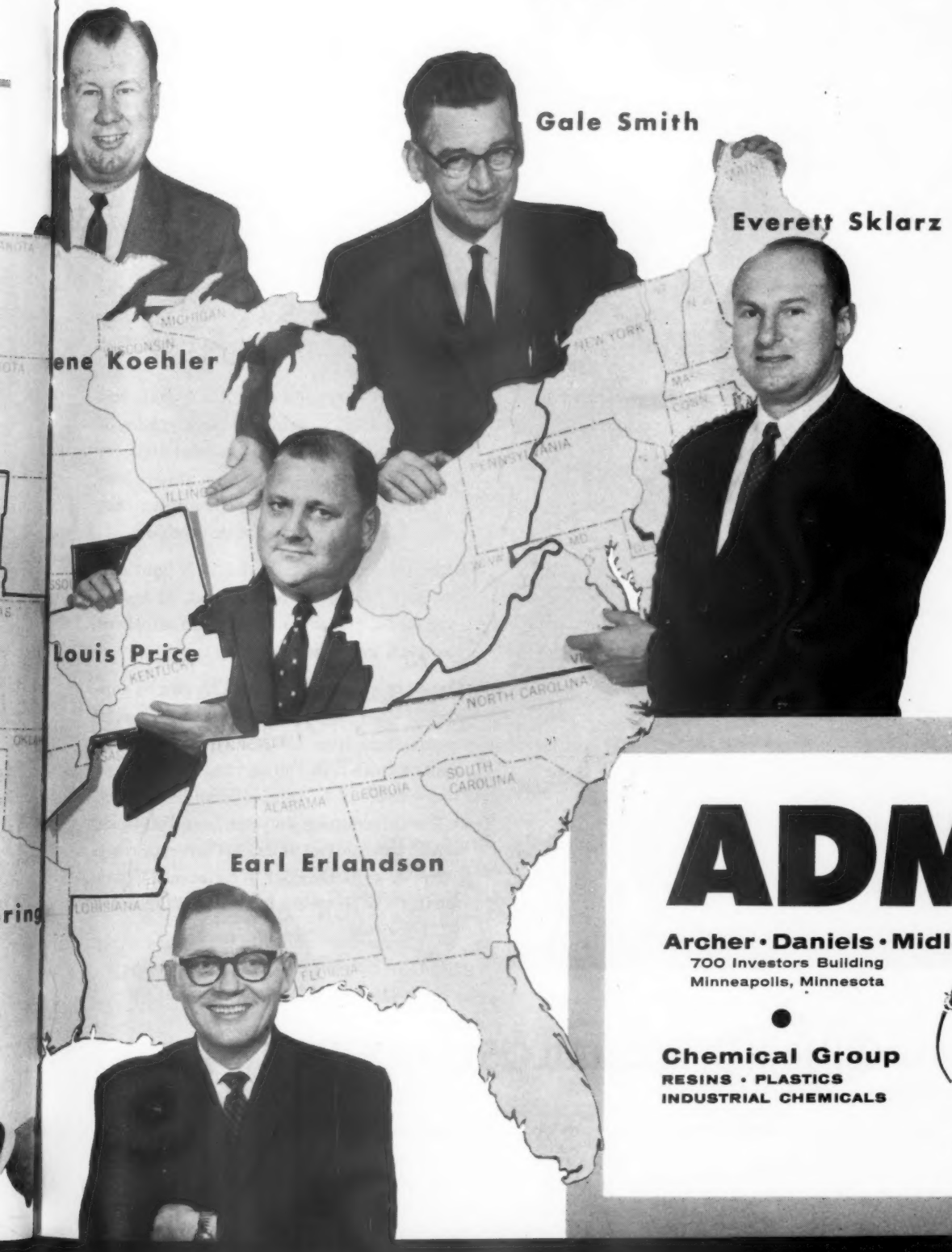
"How Johnnies-on-the-spot make ADM

Easy to buy from!"

Handling sections of the country is nothing new for these men. They're ADM's Regional Resin Sales Supervisors . . . Johnnies-on-the-spot who go all out to put ADM's sales and technical service on the map in your locality.

Customer oriented, technically trained, they head up ADM's nation-wide sales organization. Like the Company's resin, oil, and chemical plants, these men are strategically stationed and really equipped. Their job is many-fold, but has a single purpose: to help your ADM sales representative give prompt, specialized attention to all your coating needs.

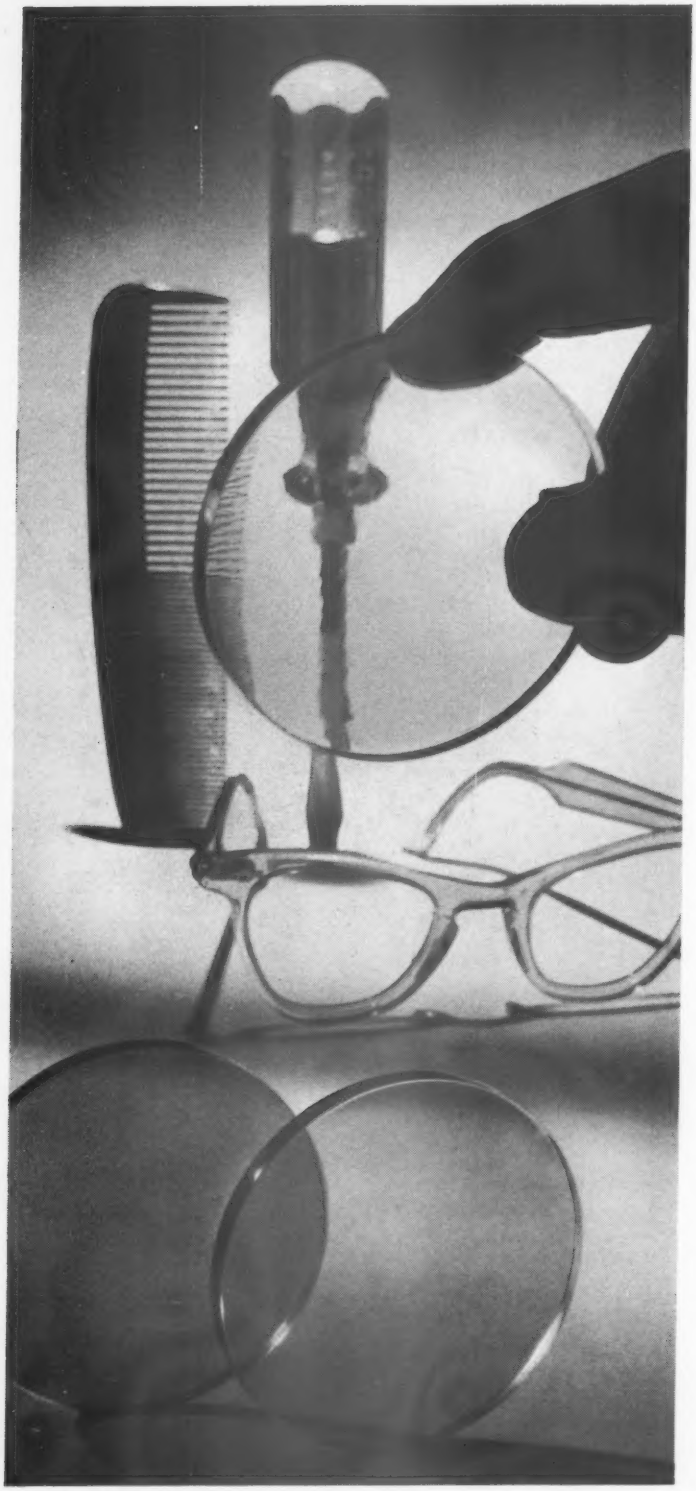
Yes ADM's regional resin sales service teams do everything possible—and a little more—to make ADM *Easy to Buy From.* Don't hesitate to call on them.



ADM

Archer • Daniels • Midland
700 Investors Building
Minneapolis, Minnesota

Chemical Group
RESINS • PLASTICS
INDUSTRIAL CHEMICALS



SALES-making SPARKLE and CLARITY

for cellulose acetate products

You're looking at the results of three methods of improving lacquers and molding powders with new high-quality Du Pont Cellulose Acetate.

This C/A sets a standard for sparkle and clarity. Shown at left are three grades of Du Pont C/A: highest clarity (at top) for brilliance and sparkle, medium grade (lower right) for tinted and pigmented items, and a third grade for opaque products.

Other properties: Du Pont C/A is light stable. It is tough. It resists heat. It resists chemicals, grease, oil. It is an excellent electrical insulation.

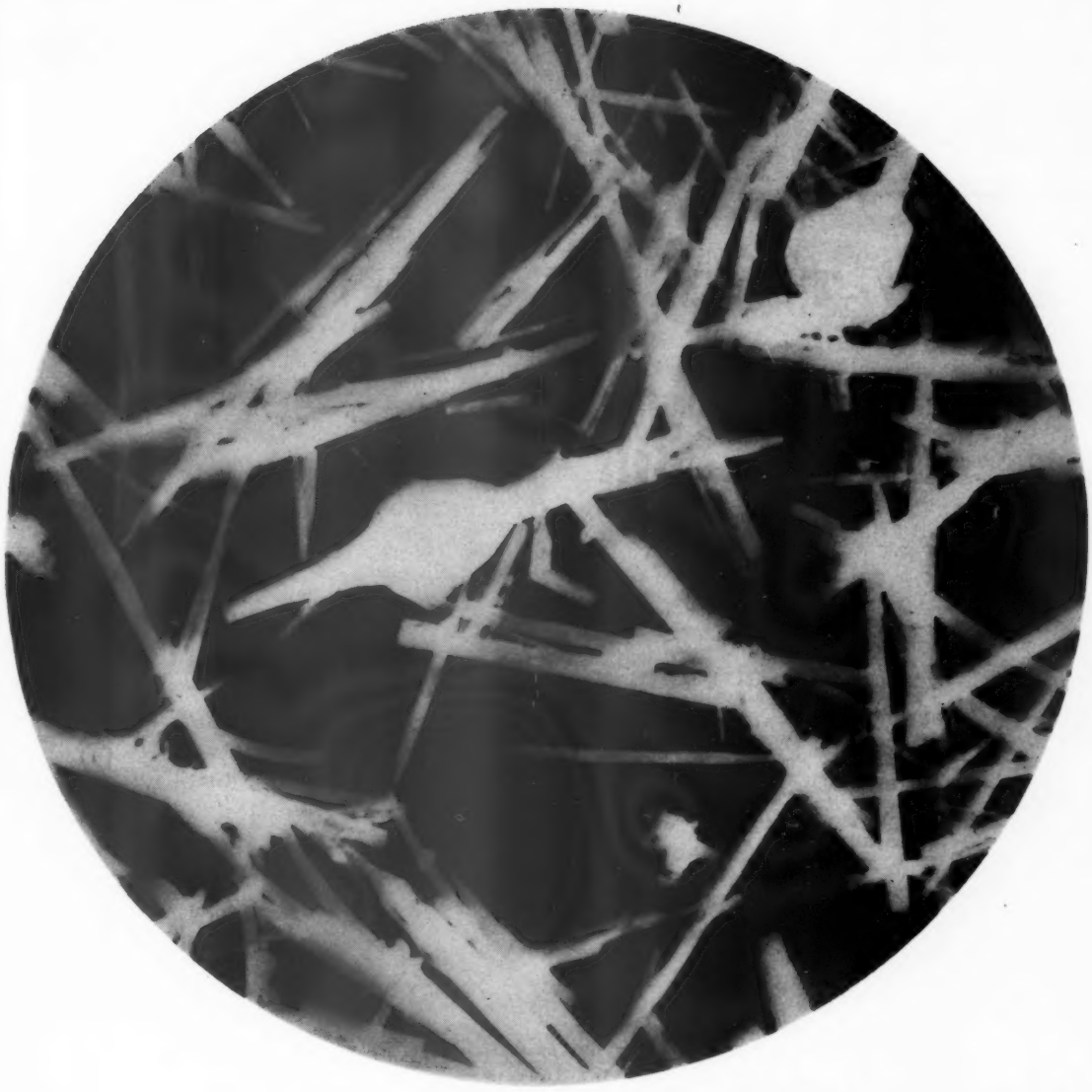
Flaked or ground: Du Pont C/A can be supplied flaked or ground. You can have it in acetylations from 52% to 56% and in viscosities from 3 to 150 sec.

Available in 50-lb. multiwall bags.

For information on pricing and shipping arrangements, call your Du Pont representative, or write Du Pont, Explosives Department, 6539 Nemours Building, Wilmington 98, Delaware.

DU PONT REG. U. S. PAT. OFF. CELLULOSE ACETATE

Better Things for Better Living . . . *through Chemistry*



How's this for "BRUSH-HEAP" STRUCTURE?

It's HORSE HEAD XX-602 zinc oxide, magnified 16,000 x. It shows the type of "brush-heap" structure you can build into your exterior house paints to provide *extra body—uniform body—true body.*

The long and thin particles of HORSE HEAD XX-602 zinc oxide offer you the most economical means of controlling consistency in your exterior house paints. We will be glad to furnish a sample for you to prove it by your own test.

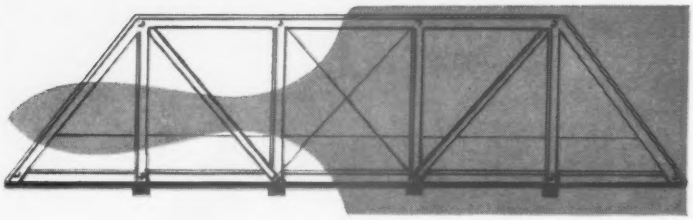
HORSE HEAD®
XX-602 Zinc Oxide

HORSE HEAD PRODUCTS®

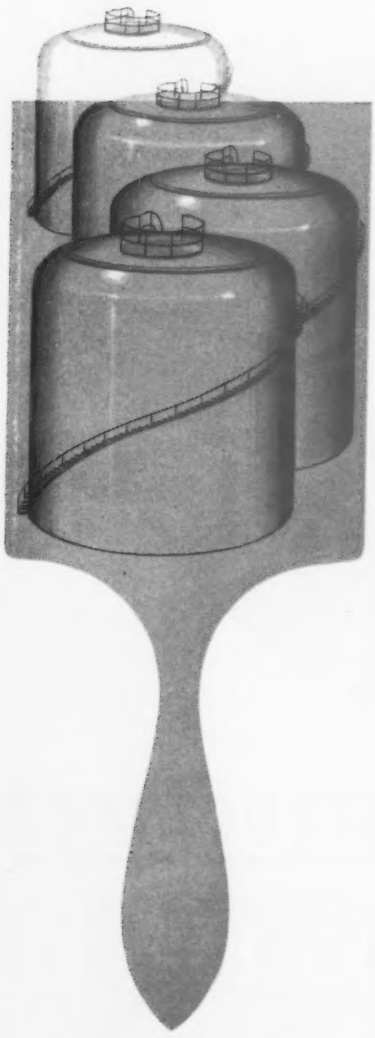
THE NEW JERSEY ZINC COMPANY Founded 1848
160 Front Street, New York 38, N. Y.

Also Distributed by
VAN WATERS AND ROGERS SEATTLE • PORTLAND (ORE.) • SPOKANE • VANCOUVER, B. C. • DALLAS • HOUSTON
ST. LAWRENCE CHEMICAL COMPANY, LTD. TORONTO, ONT. • MONTREAL, QUE.

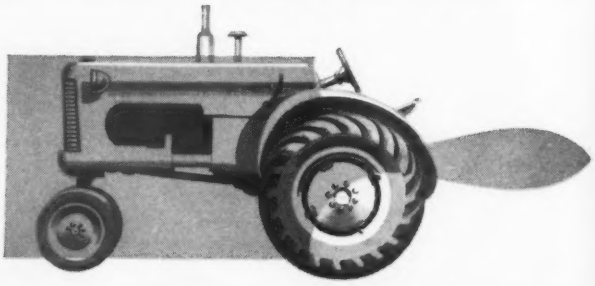
BOSTON • CHICAGO
CLEVELAND • OAKLAND
LOS ANGELES



You get LOW TINTING STRENGTH



with



EAGLE-PICHER PERMOX® 1-4-3 (Basic Lead Silico Chromate)

Permox 1-4-3 is not only an outstanding metal protective pigment, it also has very low tinting strength.

This property of low tinting strength makes possible the production of economical, durable and decorative anti-corrosive maintenance paints and enamels in an almost unlimited range of colors. These can vary from deep tones to pastels, without sacrificing rust inhibiting qualities.

Since Permox 1-4-3 is designed to go in all three paint coats, maximum protection against rust becomes *cumulative*. Furthermore, this use of a protective pigment in each coat minimizes the possibility of corrosion arising from skips and holidays during application, and permits the use of an anti-corrosive finish coat for both spot priming and finishing.

Suggested formulations are available for a wide variety of these anti-corrosive and decorative paints designed for specific needs. We welcome inquiries and are prompt to respond.

Permox 1-4-3 Conforms to ASTM Specification D-1648

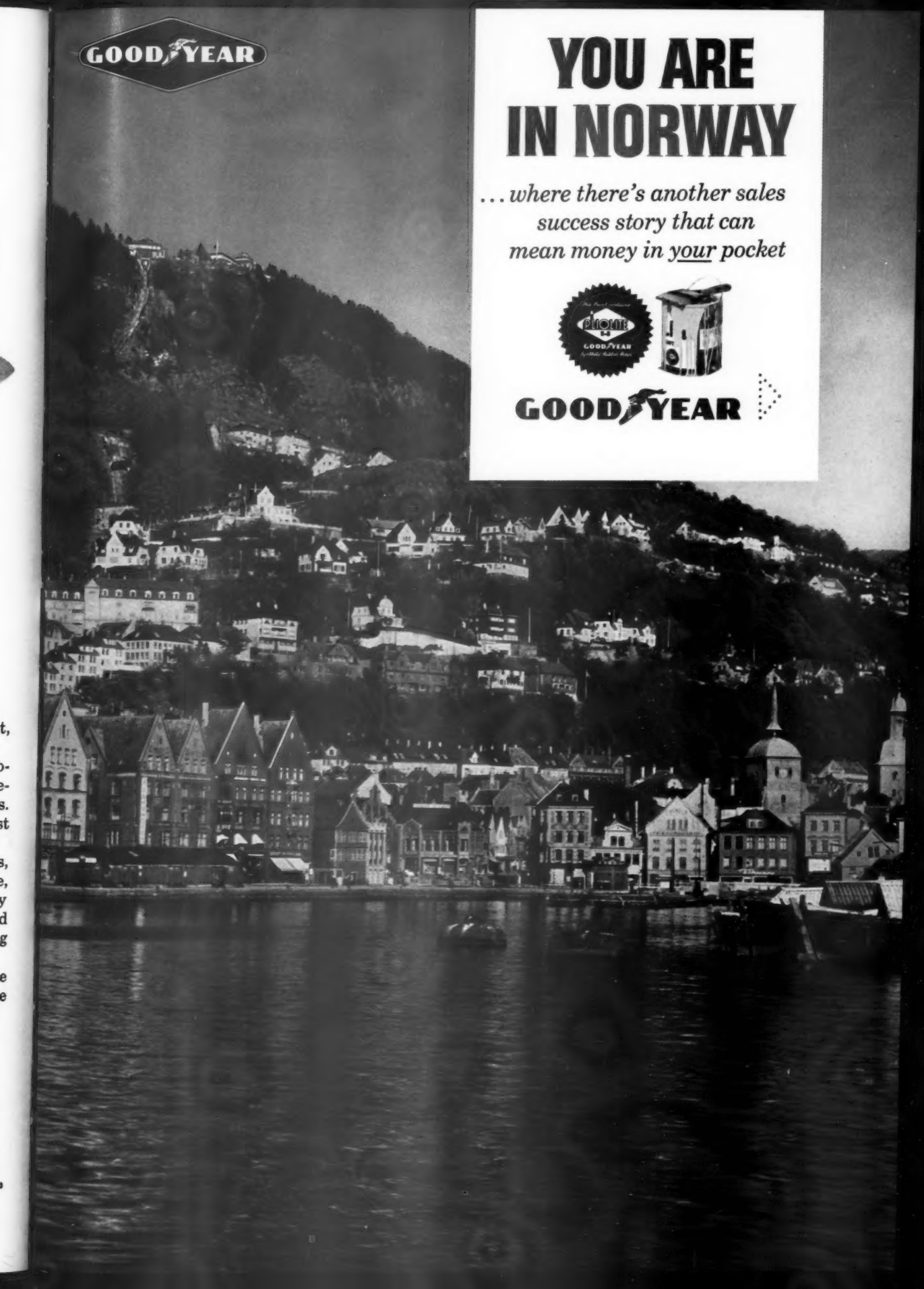
Since 1843

EAGLE EP PICHER

EAGLE-PICHER

The Eagle-Picher Company • Dept. PVP-660
Cincinnati 1, Ohio
Regional sales offices: Atlanta, Chicago, Cleveland, Dallas, Kansas City, New York, Philadelphia, Pittsburgh

West Coast Sales Agent, THE BUNKER HILL COMPANY, Chemical Products Division • Seattle • Portland • Oakland • San Francisco • Los Angeles • Kellogg, Idaho


GOODYEAR
YOU ARE IN NORWAY
...where there's another sales success story that can mean money in your pocket
PHOMTE
GOODYEAR
GOODYEAR

THE NORWAY STORY

Most folks think of Norway as a cold, snow-covered country. And for the most part it is. But the southwest coast—under the influence of the Gulf Stream—is quite mild.

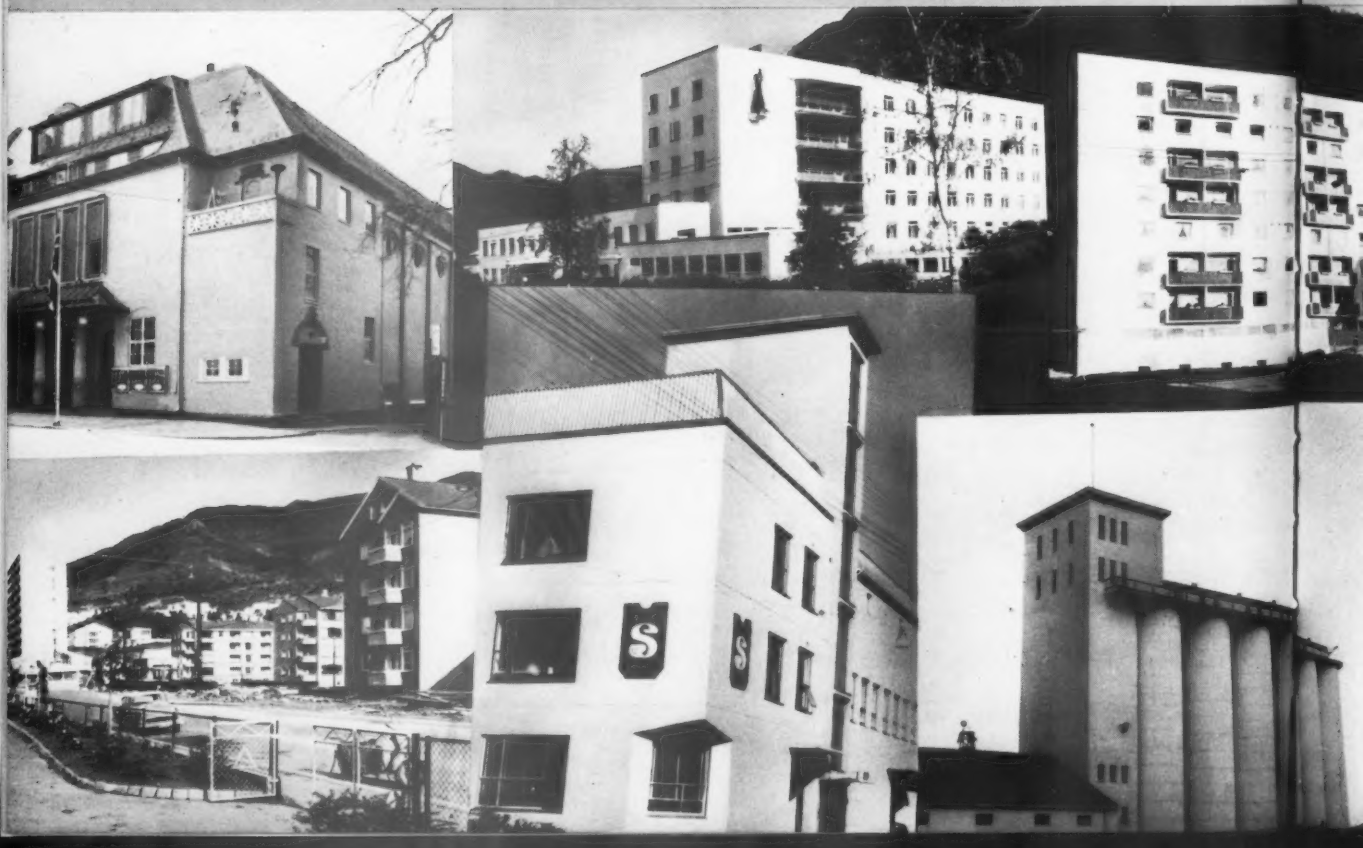
All is not so rosy as it may seem, however, since the sea winds drop their moisture as they rise above the mountain wall. Actually, it's quite wet most of the year. The city of Bergen, for example, receives about 76 inches of rainfall during that time.

So much moisture created a problem for local paint

manuf
the al
buildi
failure

But th
wegian
finishe
proved
lasted
coatin

The m



manufacturers in that it accelerated the attack of the alkalies in the many stucco and masonry buildings of the area. Result: Too many premature failures – too many dissatisfied customers.

But the answer was found by a group of Norwegian paint manufacturers in exterior masonry finishes based on PLIOLITE S-5. These paints soon proved a match for the moisture and alkalies – lasted many times longer than previously used coatings.

The moral of the story: You can turn problems into profits with the right paint for the job. And you'll go a long way to find anything more right for masonry than easy-applying, quick-drying paints made with PLIOLITE S-5.

How can you make the PLIOLITE S-5 story your story? Do as manufacturers did in Norway, Hawaii and throughout this country – simply follow the steps outlined on the next page.

Photographs taken through the cooperation of Star Maling og Lakkfabrikk, Drammen, Norway.

To make a "Norway Story" happen to you, just follow this three-step route:

simple route to raising your share of the rising masonry paint market

1 **Get all the facts** on PLIOLITE S-5 from your Goodyear Chemical Division representative. He's well qualified to help you produce the kind of paints you want to have carry your label.

2 **Before you go** to your dealers with your new line, let the Goodyear Chemical Division representative talk to your salesmen and give them the full PLIOLITE S-5 story along with helpful hints on how best to present it.

3 **When you're ready** to launch your promotion of these paints, make sure you are taking advantage of the sales aids Goodyear provides to users of PLIOLITE S-5.

Start now to write *your* PLIOLITE S-5 story by contacting your Goodyear Chemical Division representative. Goodyear, Chemical Division, Dept. R-9450, Akron 16, Ohio.

Lots of good things come from

GOODYEAR

CHEMICAL DIVISION

Pliolite—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

5-YEAR OUTDOOR TESTS PROVE . . .

Celanese CL-202 provides excellent tint retention at high PVC's

POLYVINYL ACETATE COPOLYMER EMULSION

You can use pigment volume concentrations of up to 45% with CL-202 and still achieve excellent tint retention. This finding is based on studies of painted wood and masonry exposed to weather over a period of five years. Test fences, test houses and field reports gathered throughout the country provided the evidence.

CL-202 paint films are non-yellowing and exhibit outstanding durability. Fine-particle size CL-202 emulsion gives your formulations greater stability and better quality. Our experienced technical staff will be glad to assist you in formulating exterior paints. For more information, simply write to:

Celanese Chemical Company, a Division of Celanese Corporation of America, Dept. 55P-F 180 Madison Avenue, New York 16, N.Y. Celanese®

Canadian Affiliate: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver.
Export Sales: Amcel Co., Inc., And Pan Amcel Co., Inc., 180 Madison Ave., New York 16.

Celanese CHEMICALS

On the formulation tightrope?

Don't be the fall guy. Surefooted paint men know that, when they use a Baker paint additive in their formulations, rheological properties are under control . . . proper balance assured . . . pigments suspended . . . sag eliminated. Baker additives take the chance out of formulating, produce batches that consistently please manufacturer and customer alike.

THIXCIN R®. . . best of all for *selling the customer* on the appearance of your paint in the can and its performance on the job.

M-P-A®. . . best of all for *selling the customer* on that difficult industrial problem where extra performance is needed.

These time-proved additives impart the anti-sag and flow control, pigment suspension, smooth brushability, controlled penetration, and can stability that insure optimum paint performance. Ask your Baker man today for the full story on THIXCIN R and M-P-A and, most important, their use in *your* formulation. Baker plants at Bayonne and Los Angeles, offices and warehouses in principal cities.

the **Baker** castor oil company
ESTABLISHED 1857
BAYONNE, NEW JERSEY

'7784

SPENCER-KELLOGG FORMULA

75 pounds of Celite are mixed in every 100 gallons of Spencer-Kellogg's Cykelin 70 based gray shingle and shake paint. For full details write for Shingle and Shake Paints bulletin. Address Spencer-Kellogg and Sons, Inc., Buffalo 5, New York.

In exterior flat paints tint retention is a must!

For uniform flatness and chalk resistance Spencer-Kellogg's formula calls for Celite diatomite

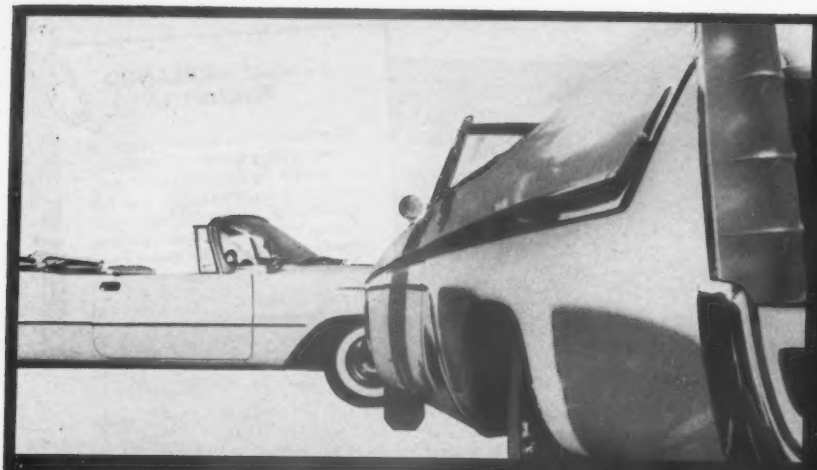
CELITE* diatomite pigments bring three important benefits to exterior paints. First, their interlacing structure provides a strong film reinforcement to help retain tints and resist chalking. Second, these irregularly shaped particles diffuse light and create a soft, uniform flatness. Third, their high porosity permits paint films to breathe, helps resist blistering and peeling.

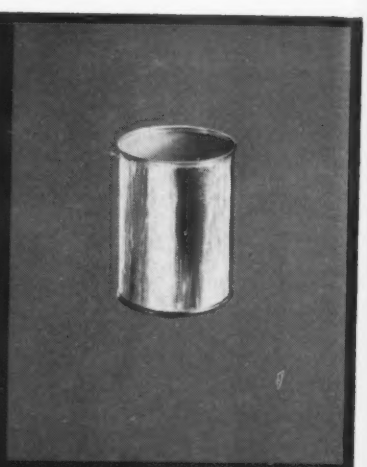
Find out how Celite can help you improve your exterior paint formulations. Write for further information to Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

JM PRODUCTS

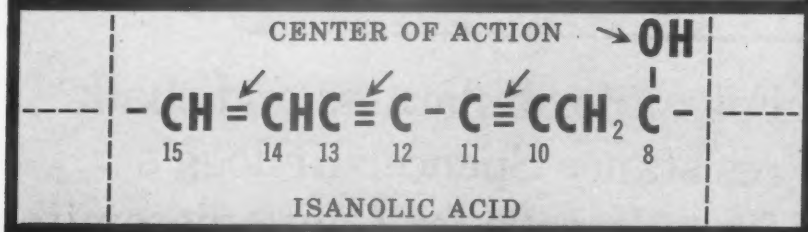
Johns-Manville CELITE Diatomite Pigments





from cars to tin cans . . .
PVO ISANO OIL with Epoxy Resins
gives Maximum Hardness
Greater Flexibility
Chemical Solvent Resistance

CENTER OF ACTION



ISANOLIC ACID

Continuing P.V.O. laboratory tests prove that Isano Oil Epoxy Resins can achieve new types of coating for you—with properties never before available.

The unique chemical make-up of Isano Oil, and its reactivity to heat, leads to chemical and solvent resistant baked coatings that retain superior hardness, greater flexibility, and adhesion to a very unusual degree.

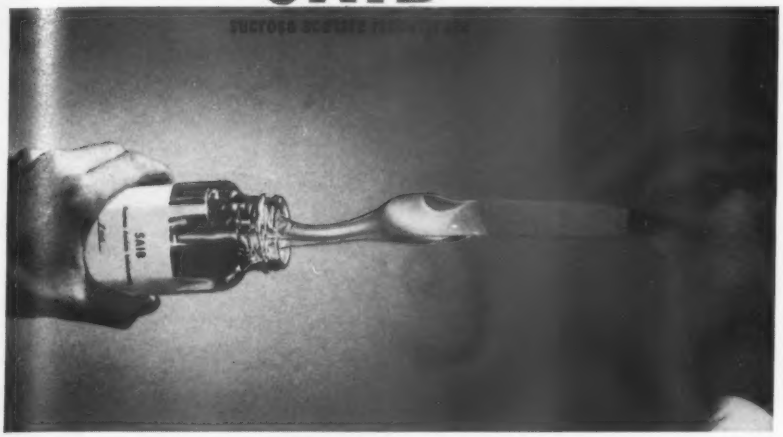
These desirable features and the moderate cost of Isano Oil indicate that, among the many other uses to come through research, superior formulations can be achieved in automotive primers, appliance primers, can coatings, drum linings and wire coatings. For our brochure on Isano Oil formulations with Epoxy and Phenolic Resins, and in Alkyds, write Dept.

PACIFIC VEGETABLE OIL CORP.
1145 South Tenth Street • Richmond, California

AGENT LIST

- ATLANTA, GEORGIA
  G. R. Nottingham Co.
- BOSTON, MASS.
  R. B. Huber, Sales Eng.
- CHICAGO, ILLINOIS
  Daniel G. Herely Co.
- CLEVELAND, OHIO
  Donald McKay Smith Co.
- DALLAS, TEXAS
  W. W. Richerson Co.
- DETROIT, MICHIGAN
  G. E. Moser & Son, Inc.
- HOUSTON, TEXAS
  Joe Coulson Co.
- KANSAS CITY, MO.
  Ack Sales Company
- LOS ANGELES, CALIF.
  Pac. Vegetable Oil Corp.
- LOUISVILLE, KENTUCKY
  The Argus Co.
- MILWAUKEE, WISC.
  J. W. Copps
- MINNEAPOLIS, MINN.
  Horton-Earl Co.
- MONTREAL, CANADA
  B. & S. H. Thompson & Co., Ltd.
- NEW YORK, NEW YORK
  Pac. Vegetable Oil Corp.
- PHILADELPHIA, PENN.
  Baker Industrial Oils Co.
- PORTLAND, OREGON
  W. Ronald Benson, Inc.
- SAN FRANCISCO, CALIF.
  Pac. Vegetable Oil Corp.
- SEATTLE, WASHINGTON
  W. Ronald Benson, Inc.
- ST. LOUIS, MISSOURI
  Ivan T. Bauman Co.
- TORONTO, CANADA
  B. & S. H. Thompson & Co., Ltd.

Unique function of SAIB aids lacquer formulators



SAIB has a molecular weight of 838. At room temperature, it is a semi-solid. Its color is exceptionally light and its color stability upon exposure to heat or ultraviolet light is excellent. (Heated to 175°C. for a period of 6 days, its color increases slowly to straw yellow, with no appreciable change occurring until after 24 hours of heat-aging.) SAIB is unaffected by contact with bronze powders. It is compatible with a wide variety of polymers, modifiers and plasticizers and is highly soluble in most common solvents. (A 90% solution of SAIB in ethyl alcohol has a viscosity of only 750 centipoises at 30°C.)

SAIB increases solids content

The high degree of compatibility exhibited by SAIB with virtually all major film-formers coupled with its exceptional solubility in common lacquer solvents *(see table below)* permits formulation of high-solids lacquers at practical application viscosities.

Viscosity of 50% SAIB Solutions

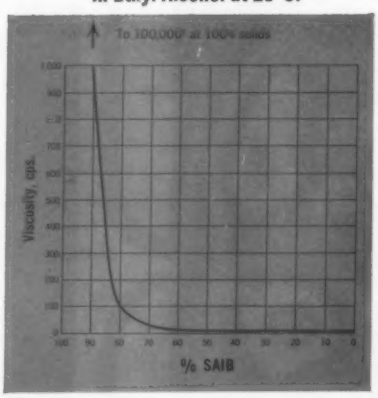
(Brookfield viscometer, 25°C.)

Solvent	*Viscosity, cps.*
Ethyl alcohol	8
Isopropyl alcohol	14
Ethyl acetate	8
n-Butyl acetate	9
Toluene	9
Hexane	6
Methyl ethyl ketone	6
Methyl isobutyl ketone	8
1-Nitropropane	11

SAIB improves film properties

One of the most significant characteristics of SAIB is its effect on film hardness at high modification. With nitrocellulose, for example, the Sward hardness of a 50% SAIB-modified film is increased from 65 to 78. Higher modification yields softer films. Cellulose acetate films also are increased in hardness upon addition of SAIB. In this case, however, maximum hardness occurs at a concentration of about 25%. With cellulosic films other than nitrocellulose and cellulose acetate, high modification produces only a slight decrease in hardness with no significant change in solution viscosity.

Viscosity of Solutions of SAIB in Ethyl Alcohol at 25°C.



Other film properties can often be improved. Plastic lacquers formulated with Half-Second Butyrate and SAIB, for example, show very good adhesion to Mylar polyester film and nylon. Such lacquers can also be made heat-sealable. Vinyl and acrylic solutions when modified with SAIB show improved sprayability and less tendency toward cobwebbing, with no significant change in viscosity.

Good flexibility in many SAIB-modified polymers can be achieved by including small amounts of Eastman polymeric plasticizer NP-10.

How does SAIB function in lacquer systems?

Note that the room-temperature viscosity of a solution of SAIB in ethyl alcohol remains below 10 centipoises up to 50% solids, increasing to only 100 centipoises at 80% solids *(see graph)*. At this point, however, the viscosity increases sharply to the 100,000+ level of pure SAIB. A similar relationship exists between SAIB and other common lacquer solvents.

At the highest conceivable concentration at which SAIB might be used to modify a lacquer system, therefore, its effect on application viscosity is negligible. Even after much of the solvent has evaporated from the film, SAIB does not hinder flow-out or leveling. While this phenomenon might also be observed with certain plasticizers, SAIB does not exhibit plasticizing properties, hence its very limited effect on the resulting film.

Because of its unique behavior, plus its low color, stability and reasonable cost, SAIB offers a new approach to lacquer formulation. It is supplied both as a 90% solution, designated *SAIB-90*, and in the undiluted form, designated *SAIB*. For a sample of SAIB, as well as a technical report on its physical properties and performance in coatings, write your nearest Eastman sales office or EASTMAN CHEMICAL PRODUCTS, INC., Chemicals Division, KINGSPORT, TENNESSEE.

SAIB

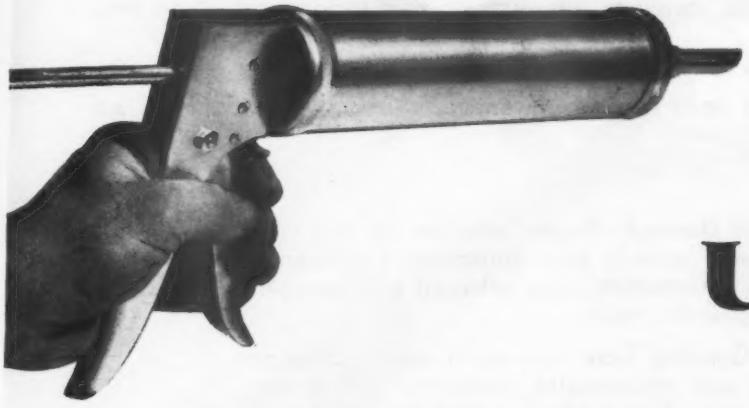
SUCROSE ACETATE ISOBUTYRATE

Eastman CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; Atlanta; Chicago; Cincinnati; Cleveland; Detroit; Framingham, Massachusetts; Greensboro, North Carolina; Houston; New York; Philadelphia; St. Louis. **West Coast: Wilson and Geo. Meyer & Company,** San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

COLUMBIAN
for outstanding blacks
every step of the way!
For unsurpassed jetness combined with ease of dispersion in lacquers and enamels . . . Columbian's carbon blacks are the ultimate! There's a Columbian carbon black to meet your most exacting requirements for paint . . . to give you unequalled product quality . . . efficiency . . . profit!
COLUMBIAN CARBON COMPANY
380 Madison Ave., New York 17, N. Y.
NEO SPECTRA® II
. . . the standard black for top quality enamels and lacquers
SUPERBA®
. . . perfect balance for excellent blackness and mass tones.
EXCELSIOR®
. . . the all-purpose black . . . fine jetness at moderate price.
MOLACCO®
. . . for minimum flooding and floating, Molacco is ideal.

for IMPROVED STABILITY in Caulking Compounds



Use Special T-Blown Soybean Oil

SPECIAL T-BLOWN SOYBEAN OIL is recommended for quality caulking compounds. It provides all the excellent wetting and working properties of a quality blown soybean oil with excellent package stability.

For further information on SPECIAL T-BLOWN SOYBEAN OIL and other Spencer Kellogg blown soybean oils, contact your nearest Spencer Kellogg representative or write to the Technical Service Department in Buffalo.

SPENCER KELLOGG AND SONS, INC.

BUFFALO 5, N.Y.

SPENCER SK KELLOGG

Five Reasons Why ASBESTINE® 325 Improves Products, Saves Money

ASBESTINE 325, the first "tailored" magnesium silicate of the famous ASBESTINE family, displays several advantages which can save you money and improve your products. That's why ASBESTINE 325 is popular as the sole functional pigment in many house paints, finds increased use in other finishes and is included in numerous coatings' research and development programs.

Here are five important reasons why you can expect ASBESTINE 325 to upgrade performance and lower costs in your current formulations or those you are developing.

1. ***Lowers Oil Demand***—Proper selection of ore combined with "tailored" particle size distribution, i.e., oversize particles removed, intermediate sizes balanced and fines proportioned, accomplish this result.

2. ***Reduces Grinding Time***—Is a stir-in grade. Absence of large particles and agglomerates, combined with its easy wetting characteristics, effect a Hegman of 4-4½ in minimum time with conventional mixing equipment.

3. ***Improves Leveling***—Paints properly formulated with ASBESTINE 325 tend to exhibit improved sag resistance, easier brushability, and better leveling.

4. ***Aids Wetting***—In oil, oleoresinous or water emulsion formulations ASBESTINE 325 wets easily. Because it wets readily, complete dispersion can be expected quickly and suspension maintained. Does not have after-wetting tendencies.

5. ***Lengthens Shelf Life***—Tests show paints made with ASBESTINE 325 resist hard settling—even after prolonged storage. Fluid consistency is restored with quick agitation because of soft settling properties.

For Further information on, or samples of ASBESTINE 325, write today. Let us help you to improved surface coatings at lower cost.

TALC

ONLY PRODUCER OF ASBESTINE

INTERNATIONAL TALC CO., INC.

WORLD'S LARGEST PRODUCER OF TALC

90 WEST STREET, NEW YORK 6, N.Y. Cable Address FIJAMENTE

Warehouse stocks carried by representatives in Principal Cities throughout United States and Canada

Leading Roll

Outstanding performance is assured when paint is formulated with Glidden Zopaque Titanium Dioxide

Paints look better and stay that way when pigmented with Glidden Zopaque.

Zopaque, the whitest white obtainable, exhibits great opacity and tinting strength — adds to the durability of any finish. It is available in several highly dispersible free-chalking and chalk-resistant grades.

Write now for complete details on how Glidden Zopaque Titanium Dioxide can help you produce superior finishes.

QUALITY Glidden PRODUCTS

FINEST PIGMENTS FOR INDUSTRY

The Glidden Company
Chemicals — Pigments — Metals Division
Baltimore 26, Maryland

(This advertisement is printed on paper stock containing Glidden ZOPAQUE Titanium Dioxide.)

DOES EVERYTHING BUT CLEAN THE BRUSH!

"Cargill Polyurethane is the vehicle for the most versatile wood finish we've ever sold"
—G. D. Hough, President, North Star Paint & Varnish Co.

"We call it *Velv* because it brushes out and dries quickly to a velvety finish without rubbing or waxing. But that's just part of the story . . .

"Polyurethane's tough, flexible qualities make *Velv* unusually resistant to scuffing and marring. And it's waterproof and alcoholproof.

"It's a true all-purpose coating—primer, sealer and finish coat, all in one can, for interior or outside jobs alike.

"You'll probably guess that *Velv's* a sales success. It is. It is the fastest selling new product that we have ever introduced."

Mr. Hough's company is one of many coatings manufacturers who have found Cargill oil-modified polyurethanes to be ideal vehicles for their formulations. For specifications, suggested formulations and uses, write:

CARGILL

CARGILL, INCORPORATED

200 Grain Exchange, Minneapolis, Minnesota, Dept. 105
basic supplier to the coatings industry

ASTM COMMITTEE D-1 on PAINT, VARNISH, LACQUER AND RELATED PRODUCTS

By
Walter A. Gloger

THE Twentieth Century has witnessed the transformation of the old crafts of the varnish-maker and the paint-maker into the vigorous, young applied science of organic coatings. These old crafts of the paint-and varnish-makers in turn had evolved but gradually—over many, many centuries—from the age-old arts of decorating and protecting important and special objects and places. Changes and improvements in these arts and crafts came but slowly and were most often haphazard—and often met with blind and violent opposition from the practitioners of the craft.

But the phenomenal growth of the physical and applied sciences in the last two centuries caused profound changes in almost all of the industrial arts, including that of painting. By the end of the Nineteenth Century, there was evident a growing recognition of the need for applying the exact methods of science to a large number of the older craft industries. It was at about this time that some of our major societies for the industrial sciences were founded.

In 1902, the American Society for Testing Materials was incorporated separately, following several years of association as the American section of the International Society for Testing Materials. In that same year, 1902, the American Society for Testing Materials organized its technical committee now known as Committee D-1 on Paint, Varnish, Lacquer and Related Products.

About the Author

Walter A. Gloger, Assistant Technical Director of the Research Laboratories of the National Lead Co., has been with the firm for over 20 years.

From 1935-36, Mr. Gloger was with Ault & Wiborg Corp., Cincinnati, Ohio. He joined Nu-Enamel Corp. in 1936, remaining there through 1939.

A graduate of De Pauw University, Mr. Gloger is a member of the American Society of Testing Materials, Secretary of ASTM Committee D-1, and a member of American Chemical Society, Federation of Societies for Paint Technology, New York Society, and American Association for the Advancement of Science.

The measurement of the properties of a class or group of materials is essential to the successful application of scientific principles and procedures to such materials. It has been a prime objective of Committee D-1, in all of its 58 years, to serve the paint and coatings industry by developing means for measuring the properties of paints and coatings and the raw materials used to make them. These methods of test are invaluable means for the better understanding of the products to which they are applied and for the exchange of information about them.

All of us agree on the importance of test methods. We should also agree on the qualities or characteristics of good test methods. It is imperative that test methods be *uniform* so that a product manufactured in one place and used in another perhaps far distant, will be tested by the same procedure for a given property. In addition, test methods must be *meaningful* and *permit interpretation* of the results obtained. And finally, it is desirable that test methods be *up-to-date* and use as much of the latest knowledge, techniques and instrumentation as is reasonably possible. It continues to be the objective of Committee D-1 to develop methods of test which meet these qualifications.

Membership

Committee D-1 is one of more than 80 standing technical committees of the American Society for Testing Materials. As its name indicates, it is directly concerned with paints, varnishes, lacquers and related products and the materials used in the manufacture thereof. This is admittedly a very broad

field of interest and, furthermore, in recent years has been expanding at a rate greater than at any previous period in the industry's history.

The Committee now has a membership of 375 personal and company members. Many of the company memberships are represented by two or more individuals which brings the total D-1 membership to 570. Its membership is drawn from all parts of the paint industry, including manufacturers of paints, consumers such as companies, municipalities, state and federal departments; it includes manufacturers of raw materials and non-profit educational and trade organizations. Most of its members are employed in some phase of technical activity related either to laboratory or production. Many of its members hold positions of high responsibility within their organizations.

Committee Plan

Committee D-1 is organized on the committee plan. Its presiding officer is Chairman W. T. Pearce, Consultant on Organic Coatings, with a lifetime of experience in education and industry. Its Vice-Chairman is E. W. Fasig of the Lowe Brothers Company, Dayton, Ohio, who also is well known for his life-long contributions to the paint industry. Its Secretary is W. A. Gloger, of the National Lead Company Research Laboratories, Brooklyn, New York. The three officers are elected for two year terms. The officers, along with nine other members elected for six year terms, make up the Advisory Committee which formulates and directs the policy and work of the Committee through the chairmen of its 19 subcommittees.

Each of the subcommittees is under the direction of a permanent chairman appointed by the Chairman of Committee D-1. Each subcommittee operates under a stated scope which designates its area of responsibility. Thus, for example, Subcommittee IV on Traffic Paint is concerned with methods of test for traffic paints only, Subcommittee XI on Resins is concerned with the development of methods of test and specifications for resins, and Subcommittee X on Optical Properties is concerned with studies involving methods of test for the optical properties of protective coatings.

It will be noted that methods of test have been specified in each of the examples and that specifications were mentioned in the case of a raw material, resins. It has always been the policy of Committee D-1 with respect to paints and other forms of protective coatings to be used by a consumer, to confine itself to the development of methods of test. Committee D-1 does not undertake to prepare specifications for any class or kind of protective coating.

Each of its subcommittees is again organized on the committee plan. The subdivisions of the subcommittees are called working groups which work under the direction of a chairman appointed by the subcommittee chairman. In most cases, a working group has one single, specific objective; when the objective has been accomplished, the work of the group is considered to have been completed and the group is disbanded. For example, Subcommittee VIII on Methods of Chemical Analysis of Paint Materials currently has a working group with the title, Water Soluble Salts of Pigments by Conductivity Methods. This group is engaged in a cooperative effort to develop a method of test described by the group's title. It will remain active until its work is completed or its results show that further effort in that direction would not be fruitful. This group is developing a most promising new method of test which will be a significant and most useful contribution to the paint industry.

Voluntary Participation

All the work and participation in Committee D-1 is voluntary. Membership on the subcommittees and on the working groups is open to any member of Committee D-1 and is made by appointment by the chairman of Committee D-1. It follows, therefore, that there is a high level of interest and participation within the subcommittees and their groups; no one *has* to be a member of them unless he wishes to and is truly interested in their undertakings.

The entire Committee holds two meetings each year. The first meeting is held early in the year, most often in February, and the second meeting is in June or early July. In addition, the Advisory Committee holds a meeting early in the fall of each year at which time the subcommittee chairmen or representatives designated by them are required to attend. This meeting is for the purpose of reviewing the plans of work of each subcommittee for the ensuing winter and spring. In this way, the Advisory Committee is informed of the progress being made within each subcommittee and may suggest new directions to be investigated, approve the termination of unfruitful work, and arrange for the organization and initiation of new subcommittees or working groups as required by the expanding technology of the industry.

Cooperative Plan

The work of the subcommittees and groups is most often organized on a cooperative plan. For example, a newly organized group will first give careful consideration to its commission or objective and review the available methods of attacking its problem. After agreement on the most promising approach, a method of test or procedure will be drafted as a basis for beginning the group's cooperative work. Agreement will then be reached on the samples or other materials to be used in this group's work. Oftentimes, identical samples will be distributed to all members of the group to eliminate variations between samples. The work of testing or evaluating is done in the laboratories of the members of the group. The results or data are transmitted to the group chairman along with such comments as the members' experiences dictate. The data are tabulated or otherwise appropriately compared and preliminary conclusions drawn from the total data and experience reported. At its next meeting, the group will review the results of its work and proceed accordingly, either towards further improvement of the procedure which had been used in its work, the investigation of other approaches to its problem, or the preparation of a recommendation to abandon further work as not being fruitful.

The group will continue its co-

operative development work until it is satisfied that its proposed method of test, procedure or raw material specification adequately fills the need for which the group was organized. It will then prepare a draft of its proposed method or specification in the standard ASTM format and make a formal recommendation to its parent subcommittee that the new item be submitted to letter ballot vote of the subcommittee. When put to subcommittee letter ballot in this way, a new proposal is often accompanied by tabulated data or other supporting material which has come out of the working groups' cooperative efforts.

Each member of the parent subcommittee is entitled to cast his letter ballot on the item. It is required, however, that each negative vote by supported by a written statement of the reason for it. After tabulation of the results of the vote by the subcommittee secretary, special attention is given to the reasons for any negative votes and to other comments or criticisms offered in the ballot. Every effort is made to resolve satisfactorily any and all objections raised to the proposed new item. In this way, each subcommittee member has the opportunity to bring his experience and training to bear on the results of the working group's proposal.

Only after the parent subcommittee is in complete agreement on a proposed new method of test or specification is it formally submitted to Committee D-1 where it is again sent out to letter ballot of the entire Committee membership. Again the proposal enjoys the benefits of the experience and training of all members of Committee D-1. And again, careful attention is given to the reasons for negative votes and every reasonable effort is made to reconcile them to the satisfaction of the member who cast the vote, the members of the originating working group and its parent subcommittee. Only after a proposed item has successfully passed such careful scrutiny by Committee D-1 is it submitted to the Society as a proposed new tentative standard. Once again, the Society members vote in a letter ballot and once again, any negative votes must be supported by reasons which are returned to the Committee for resolution.

Tenative Test Method

New methods of test, procedures and specifications are usually given the status of tentatives and remain in this status for at least one year. At the end of one year, the originating Committee may recommend that the tentative be advanced to the status of a standard. Within Committee D-1, such a recommendation always originates with the subcommittee which prepared the item. Thus jurisdiction over and responsibility for each tentative and standard remains with the originating subcommittee, the one best qualified to advise with respect to the item. Recommendations for advancement to standard status are again handled by letter ballot and the same procedure with respect to letter ballots as described before is followed.

Every effort is made to keep tentatives and standards up-to-date and abreast of the advancing technology of the industry. The Society requires periodic review of all standards and tentatives but it often happens that new techniques or technology are incorporated into standards before the time for the required review has come around. Such revisions of standards and tentatives are most often based on further cooperative work again conducted by the originating working group and the same procedure of submission to successive letter ballots is followed. This insures that the revisions will have the same authority and high quality found in the original standard and that the standards will be kept as up-to-date as possible.

Committee D-1 has prepared and now has jurisdiction over more than 250 tentatives and standards. These comprise the visible results of its 58 years of work on behalf of the paint industry. They include methods of test, definitions of terms, methods of chemical analysis, methods of evaluating physical conditions of films, and recommended practices. All standards and tentatives relating to paint as well as several other industrial classes are collected together in Part 8 of the 1958 Book of ASTM Standards Including Tentatives. Those standards prepared by Committee D-1 are also published separately in a paper cover with the title ASTM Standards on Paint, Varnish, Lacquer and Related Products. Both books may be obtained from the Society at 1916 Race Street, Philadelphia 3, Pa.

New Tests

At the present time, Committee D-1 is developing numerous new methods which are in various stages of completion. Some of the proposed new tentative methods which soon will be submitted to letter ballot of Committee D-1 are a proposed tentative method for water-fog testing, a proposed tentative method of test for phthalate ester color of high gravity glycerine, a proposed tentative method of test for hiding power of non-chromatic paints, and a number of others. There are also a number of proposed revisions of tentatives and standards which will be submitted to D-1 vote. In recent years each Committee D-1 letter ballot has included upwards of 35 separate items. These examples are indicative of the large amount of work under way and the steady progress that is being made to meet the industry's needs for test methods.

Much has been accomplished, but there still remains a great deal of work that needs to be done. The officers and members of Committee D-1 are well aware of the great and ever-growing need for modern test methods. The committee will welcome suggestions and increased participation from the thousands of technical men who make up so important a segment of the paint industry. Everyone who participates in D-1's work will most surely benefit from it. It should be noted that participation in person is not a primary requirement. As has been indicated, all of the laboratory work for D-1 is conducted in the laboratories of the participants and a great deal of the exchange of information is carried on by mail. Inquiries addressed to either the headquarters of the Society at 1916 Race Street, Philadelphia, or to W. A. Gloger, Secretary, National Lead Company, 105 York Street, Brooklyn 1, New York, or to the chairman of any D-1 subcommittee will receive prompt attention.

AURASPERSE INORGANICS

by Harshaw

Quality acceptance has placed Harshaw Aurasperse Inorganic Dispersions ***IN FRONT.***

Consider this significant fact in insuring the quality of your water systems.

Among the many dispersion items available from nationwide warehouse stocks are these:

W1081 Sun Yellow C

W1021 Yellow Oxide

W3041 Red Oxide

W3247 Burnt Umber

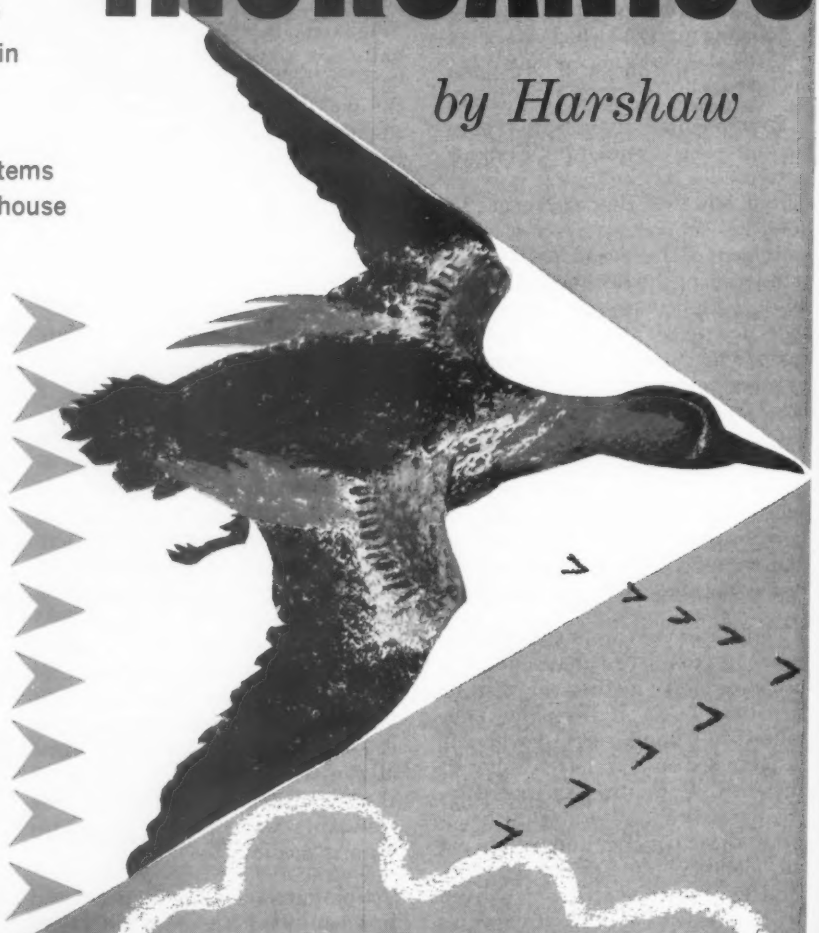
W3105 Cadmium Red

W1069 Cadmium Primrose

W308 Titanium White-Rutile

W4013 Ultramarine Blue

W6017 Chromium Oxide Green



Samples and information on these or others of this Aurasperse group available on request.

HARSHAW

THE HARSHAW CHEMICAL COMPANY

1945 East 97th Street • Cleveland 6, Ohio

Chicago • Cincinnati • Cleveland • Hastings-On-Hudson, New York
Detroit • Houston • Los Angeles • Newark • Philadelphia • Pittsburgh

THE BLISTER BOX GROWS UP

The advent of emulsion paints for exterior application points up the need for a "blister house" to test panels under conditions simulating a modern home.

By

William F. Scheufele*

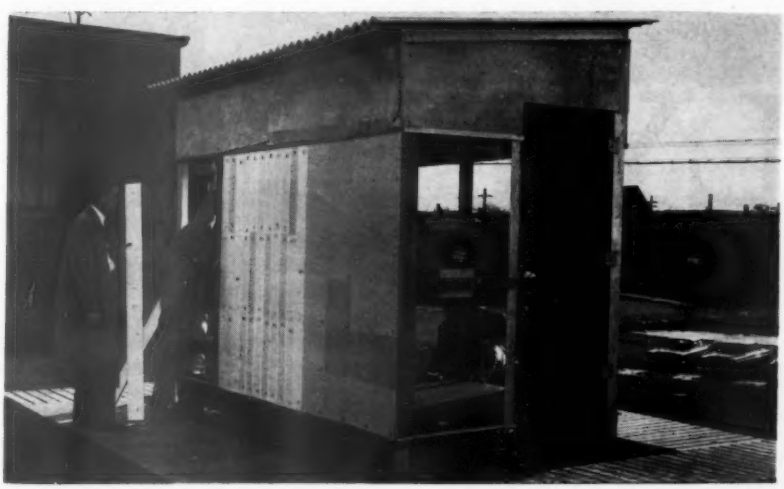
FOUR years ago Paint and Varnish Production published an article entitled, "How To Build a Blister Box" (Sept., 1956). It described a simple device for conducting accelerated tests for blister resistance of exterior paints. Moisture originating inside the box penetrates test panels which form the sides of the box, and the paints on the outside of the panels blister in varying degrees, according to their permeability. The idea was to simulate conditions present in the modern house, where quantities of moisture created inside the house migrate through the walls, blistering exterior paint.

With the same principle in mind, Dewey and Almy recently constructed a blister *house*, a framework on which test panels are mounted, and within which constant temperature and constant high humidity are maintained. The blister house is expected to provide a continuous flow of information about the performance of existing and experimental coatings under extreme conditions. The advent of emulsion paints for exteriors and the remaining problems associated with them could make a similar blister house a worthwhile investment for any supplier or manufacturer doing its own research and development on paint, and Dewey and Almy will gladly make its plans available.

The blister house is much more than its name implies, because it also shows us much about staining, grain checking, efflorescence, and loss of adhesion. All of these are greatly accelerated under wet, freezing conditions, and Dewey and Almy's blister house will be used only during the four winter months December through March, when freezing and thawing severely tax moisture-laden paint films.

Dewey and Almy's blister house was constructed last winter and already has yielded much valuable information, after just two months

(*Turn to page 102*)



On one of New England's milder winter days, first test panels are mounted on Dewey and Almy's new blister house. Author, left, holds numbered redwood panel while paint application chemist Ronald W. Beers sets another panel in aluminum channels filled with caulking compound.

*Group Leader, Organic Chemicals Research Laboratory, Dewey and Almy Chemical Division, W. R. Grace & Co., Cambridge, Mass.

Select the time-tested basic vehicle for EXTERIOR LATEX PAINT OVER WOOD:

LYTRON® 680

The market for exterior latex paints over wood is here. If you are looking for a proven basic vehicle to formulate paints that will give you a profitable share of this rapidly expanding market, Monsanto LYTRON 680 is your answer.

Over 8 years of research and evaluation are behind commercially formulated exterior latex paints based on LYTRON 680. They have had more than 4 years of exposure on all types of buildings, over all types of surfaces including oil-primed and previously painted wood, in representative climatic areas throughout the country. No matter where you market, LYTRON 680 based paints have withstood the test of time and weather. After these many years of testing and exposure by Monsanto and leading paint manufacturers, these paints have proved their excellence in every important respect—in color retention, in adhesion, durability, and recoatability.

Join the paint manufacturers now producing and successfully selling exterior latex paints formulated with LYTRON 680. For samples and data, write to Monsanto Chemical Company, Plastics Division, Room 705, Springfield 2, Massachusetts.

LYTRON: REG. U. S. PAT. OFF.

Monsanto®

MONSANTO PACE-SETTER IN **PLASTICS**

MEASURING PAINT THICKNESS USING THE *Electronic Method*

Non-destructive technique gives quick and accurate readings of paint films on various metals.

THERE has long been a need for an instrument that would non-destructively measure the thickness of paint, enamel, lacquer and other organic coatings on aluminum, brass, magnesium, copper, zinc and other non-magnetic metals. The Dermitron* non-destructive coating thickness tester is said to meet this requirement because of its ability to provide rapid, accurate and non-destructive readings of thickness of these coatings on various metals. This unit is a portable, electronic measuring instrument whose operation is based on the principle of electrical eddy-currents. Previous means of measurement of paint thickness were based on magnetic principles which involved the use of a permanent magnet or an electromagnet, and this restricted these instruments to the measurement of coatings on steel and other magnetic metals.

This instrument is capable of making measurements on most metals; and in addition to measuring paint and other non-metallic coatings, it is also capable of measuring metal coatings such as plating, etc.

*Trade Name—Unit Process Assemblies, Inc. 53-15 37th Ave., Woodside 77, New York, N. Y.

Figure 1. The Dermitron—non-destructive coating thickness tester.

Principle of Operation

The principle of operation involves the use of electrical eddy-currents which are induced in the metal on which the coating has been applied. These currents are induced by one of four measuring probes (A,B,C and D), each of which covers a different thickness range. These eddy-currents react on the probe, and the degree of the reaction depends on the coating thickness, so that the result is registered on a thickness indicator meter.

A direct-reading scale can be used so that the meter indicates the thickness of the paint coatings directly, without the need for calibration curves.

Thickness Ranges

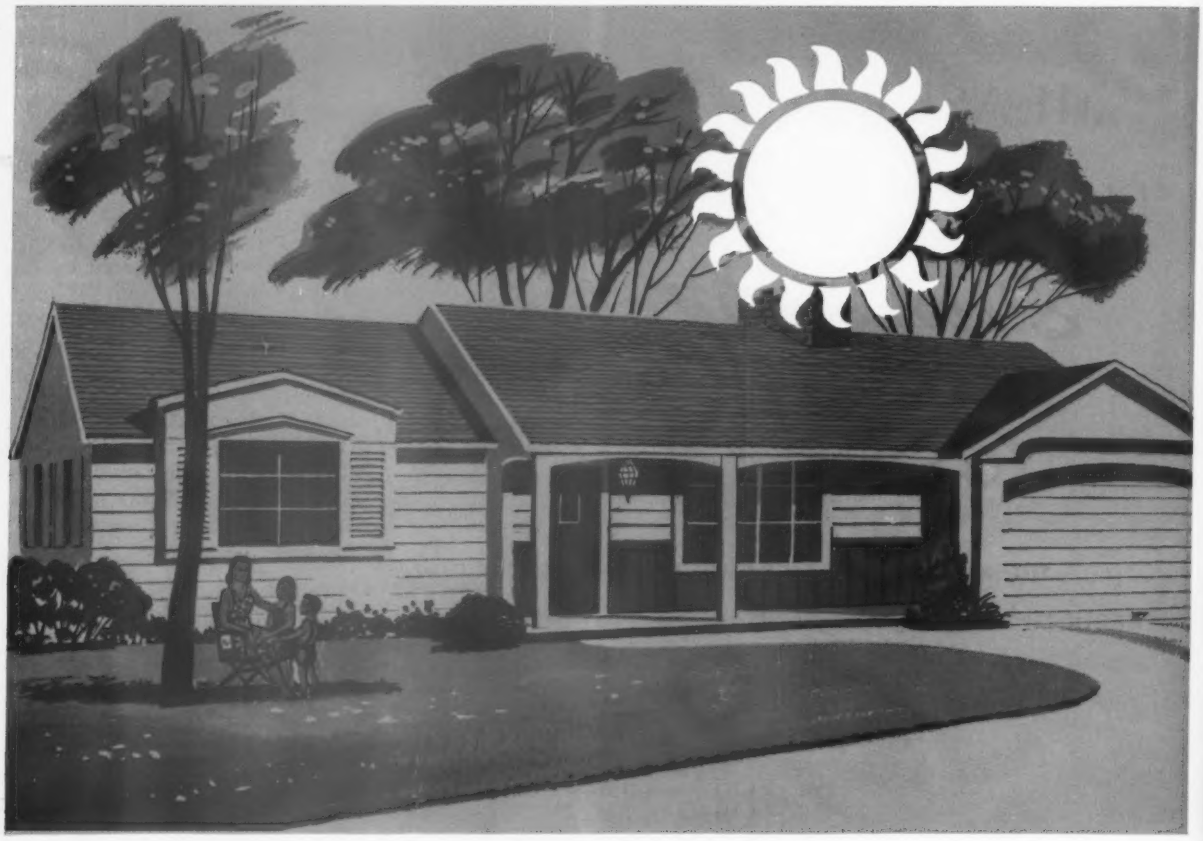
The measuring probe "D" is used to cover the popular thickness range from 0.0001" to 0.004" thick coatings. Where heavier coatings must be measured, you would use the probe "C", which covers the thickness range from 0.003" to 0.012". Still heavier coatings would be covered by the use of probes "A" and "B". A direct reading scale (Figure 2) is used for the measurement of all non-metallic films on all non-magnetic metals, in the popular thickness range from 0.0001" to 0.0024". (This Scale has two distinctly colored scales calibrated for the following two thickness ranges: 0.0001" to 0.0012", and 0.0001" to 0.0024".)

Operation

When measuring non-metallic coatings on metals (such as paints, lacquers, enamels, plastics, ceramic coatings, etc.) the instrument is equipped with gauging sheets of known thickness which are used to set a known checkpoint: the instrument is used by first applying the probe to the particular bare metal involved, and then setting the instrument to read zero. Then, the proper gauging sheet is placed on the bare metal, and the instrument set to read the corresponding thickness. Following this, measurements can be made of any non-metallic coating on this particular metal. Measurements are made in a matter of only seconds after the checkpoints have been set. This tester's accuracy is inherent in the fact that each time it is set up for use, reference samples of known thickness (gauging sheets) are used as checkpoint.

The pencil-type probes are specially designed so that only a relatively small local area is being measured: The minimum surface area required for a measurement with this tester is only a 1/8"-circle-diameter area when using a standard probe C and D. Measurements can be made on curved surfaces, both convex and concave, with the standard probes. Right-angle probes are available for measurements on internal diameters down to ½" I.D. and smaller, and Figure 3 shows this probe in operation.

(*Turn to page 104*)



Weatherproof

Your paint with **Minnesota** Linseed Oil...

On hot days the sun seems much bigger. It makes its presence felt. It can get too hot to work . . . too hot to play . . . even too hot to sleep. On poorly painted and unprotected wooden surfaces, the sun acts like a hot air furnace. It sucks moisture through the siding leaving timber tinder-dry. With old paint, the sun causes paint blisters and cracks, opening the building's "skin" to erosion by wind and rain. But take a home protected by quality paint . . . paint made with Minnesota Linseed Oil base. Time has proved that linseed oil paints can withstand blistering and cracking best of all. Why not find out for yourself why Minnesota brand linseed oil is best for purity, for quality control and dependability?

OUR 90th YEAR

SPECIFY MINNESOTA ★ IT'S PURE! ★ LINSEED OIL

Minnesota

LINSEED OIL COMPANY

MINNEAPOLIS 21, MINNESOTA • PHONE: SUnset 8-9011

BOSTON, MASS.
The Truesdale Co.
52 Cambridge St.

CHICAGO, ILL.
National Lead Co.
900 West 18th St.

CLEVELAND, OHIO
Norman G. Schabel Co.
20950 Center Ridge Road

PHILADELPHIA, PA.
E. W. Kaufmann
Box 27, Flourtown, Pa.

DAYTON, OHIO
The Dayton Oil Co.
1201 East Monument Ave.

DETROIT, MICH.
Baker & Collinson
12000 Mt. Elliott Ave.

LOS ANGELES, CALIF.
Stay & Day Paint
Materials Co.
363 South Mission Road

LOUISVILLE, KY.
H. H. Benner Co.
803 Hoffman Bldg.

PITTSBURGH, PA.
Joseph A. Burns & Son
124 Harrison Ave.

SAN FRANCISCO, CAL.
Wm. C. Loughlin Co.
311 California St.

SEATTLE, WASH.
W. Ronald Benson, Inc.
820 1st Ave. So.

ST. LOUIS, MO.
Ivan T. Bauman Co
817 N. Second St.

Heliogen Viridine 66-6001 is the yellowest green phthalocyanine pigment currently available. Now, without blending, you can obtain the bright, vibrant, yellower-green shade you desire with all the excellent fastness properties of the phthalocyanines. Heliogen Viridine 66-6001 will effectively simplify your procedures and improve the color qualities of your product.

For use in the coloring of textiles, plastics, paints, inks, and rubber, this yellowest green pigment offers these notable properties:

• excellent lightfastness • excellent stability to acids and alkalies • insoluble in organic solvents • heat stable at high molding temperatures • fine dispersing qualities • non-dichromatic • high tinctorial strength

To meet individual requirements, Heliogen Viridine 66-6001 is supplied as: toner, presscake, dispersed powder, lakes, aqueous dispersions, and flushed in suitable vehicles.

Give your products extra sales appeal with a fresh, vital new shade — Heliogen Viridine 66-6001. For competent technical assistance and service write or call your nearest GDC representative.

gdc gaf *From Research to Reality*

This advertisement printed with Heliogen Viridine 66-6001.

PIGMENT DEPARTMENT
GENERAL DYESTUFF COMPANY
A SALES DIVISION OF
GENERAL ANILINE & FILM CORPORATION
435 HUDSON STREET · NEW YORK 14, NEW YORK
CHARLOTTE • CHATTANOOGA • CHICAGO • LOS ANGELES • NEW YORK • PHILADELPHIA
PORTLAND, ORE. • PROVIDENCE • SAN FRANCISCO • IN CANADA: CHEMICAL DEVELOPMENTS OF CANADA, LTD., MONTREAL

Heliogen Viridine 66-6001 manufactured by General Aniline & Film Corporation is sold outside the United States and Canada under the trade name Fenalac Viridine Y by distributors all over the world.

6 CSC PRODUCTS FOR THE PAINT INDUSTRY

31 GOOD REASONS FOR USING THEM

2-NP
2-Nitropropane

1. Economical solvent for vinyl acetate-vinyl chloride copolymers.
2. Preferred solvent for preparation of epoxy resin finishes.
3. Medium-evaporating solvent for acrylic resins.
4. Solvent for nitrocellulose and cellulose acetate butyrate.
5. Excellent replacement for most of the chlorinated solvents ordinarily used for cellulose triacetate.
6. As additive to conventional paint and varnish removers to increase their effectiveness.

ETHYL ALCOHOL

7. Solvent for acrylic resins, nitrocellulose acetate, cellulose ethers, polyurethanes and shellac.
8. Extractant for natural resins.
9. Solvent for "knot sealer" based on vinyl-butyral and phenolic resins.
10. Solvent for preparation of corrosion-resistant lining for industrial pipes.
11. Solvent in chromate primers based on vinyl-butyral resins.

AMP
2-Amino-2-Methyl-1-Propanol

12. Emulsifier for use in preparing self-polishing floor waxes.
13. Emulsifier in water-based paints.
14. For adjusting pH of acrylic and butadiene-styrene emulsion paints.
15. For inhibiting gelling or advancement during storage of finishes containing urea-formaldehyde or melamine resins.
16. For reducing viscosity of sanding seaters containing zinc stearate.
17. Used as stabilizer for urea or melamine formaldehyde finishes.
18. Catalyst for making urea-formaldehyde resins.

TRIS AMINO
Tris(hydroxymethyl)aminomethane

19. Raw material for amine alkyd resin manufacture.
20. Use in manufacture of synthetic drying oils.

TBP
Tributyl Phosphate

21. Outstanding anti-foam agent for latex paints, paper coatings, water adhesives, casein solutions, inks, textile sizings and detergents.
22. Pigment-grinding assistant for hydrophilic pigments.
23. For prevention of coagulation of latex paints during application.
24. For insuring complete dispersion of dibutyl phthalate in polystyrene emulsions.

ALKATERGE®-C

25. Dispersing agent for silica and for carbon blacks in melamine alkyd resins.
26. For reducing viscosity of pigment-oil mixtures.
27. As pigment-grinding aid.
28. For improving adhesion in metal primers.
29. As paint pigment-dispersing agent.
30. As grinding assistant for hard resins.
31. Anti-foam agent in polyethylene coating compositions.

INDUSTRIAL CHEMICALS DEPARTMENT

COMMERCIAL SOLVENTS CORPORATION

260 MADISON AVE., NEW YORK 16, N. Y.

Atlanta • Boston • Chicago • Cincinnati • Cleveland • Detroit • Kansas City
Los Angeles • New Orleans • Newark • New York • St. Louis • San Francisco

IN CANADA: McArthur Chemical Co. (1958) Ltd., Montreal • IN MEXICO: Comsolmex, S.A., Mexico 7, D. F.

BONDING OF EXTERIOR LATEX HOUSE PAINTS TO CHALKY WOOD SURFACES

By

Temple C. Patton*

THE precautions and warnings presently carried on the can labels of trade-sales latex paints for coating exterior wood surfaces attest to the serious problems currently facing manufacturers of latex paints for exterior application. A compilation of such warnings as abstracted from labels of seven cans of latex paint purchased at random from dealer stock in the New Jersey/New York area during April 1960 clearly delineates these areas of trouble.

PRECAUTIONS AND WARNINGS ON CAN LABELS

The precautions relative to the storage and to the application of latex paint to exterior wood surfaces have been grouped under warnings concerning temperature and surface conditions respectively.

Temperature Conditions

1) Latex paint must not be applied at temperatures below 50° F. (5 companies); below 45° F. (1 company).
2) Porous surfaces should be dampened before application of latex paint in hot weather (1 company); in extremely hot hot weather, cool surface with water before applying latex paint (1 company).
3) Latex paint must be protected from freezing temperatures (2 companies).

Surface Conditions

1) Glossy Surface—Glossy surfaces should be dulled, sanded or abraded before latex paint application (4 companies).
2) Chalky Surface-Never apply latex paint over a chalky surface (7 companies). Scrub, wire brush, or otherwise remove chalk; then apply primer or undercoater and follow with latex paint.
3) New Surface-Apply primer to wood surface or treat with undercoater before application of latex paint (6 companies).

The present article deals with the major problem in the above listing, namely, the obtaining of adhesion of latex paint to chalky wood surfaces (siding, trim, shingles, shakes, clapboards).

The most promising approach to date for securing adhesion has been the use of a drying oil additive. The theory back of this approach and the practicability of this technique are discussed in turn.

Theoretical Observations

The following theoretical observations on factors controlling the effectiveness of an additive for bonding emulsion paints to chalky surfaces have been found helpful in explaining the adhesion imparted by a bonding additive.

It is postulated that three primary factors determine the effectiveness of an additive binder in securing adhesion of an emulsion paint to chalky surfaces. They are *adequacy* of the binder, *penetration* of the binder, and *dry time* of the binder.

To understand the interplay of these three factors it must first be realized that adhesion *to* chalky surfaces is a misnomer, for it is actually adhesion of the emulsion paint *through* the chalky surface to the substrate below that counts.

Hence, the bonding agent must not only be capable of *diffusing* into the chalky surface, but it also must be present in sufficient amount so that it penetrates *all the way through* the chalky surface to establish adequate contact with the solid substrate on which the chalk rests.

Emulsion paints are dispersions of resin particles in a micron range of diameter. But so are the particles of a chalky surface. To a large extent, the distance that a non-modified emulsion paint penetrates into a chalky surface is a matter of relative particle size. Some emulsion paints, of very fine particle size, may be able to diffuse to some extent into coarse chalky surfaces and if the chalky surface is very thin, establish contact and stick to the substrate below the chalky surface. However, this is a more or less unlikely situation. Most frequently, the chalky surface acts as a sieve which lets the water through but holds the solid emulsion particles back. This explains the relatively poor results obtained by using hydrophilic wetting agents, which may let the water through faster, or by opening up channels to some extent, may somewhat improve particle penetration. However, resort to this expedient appears to be dubious.

The key to the situation is the use of a binder additive which *penetrates* through the chalk particles to the substrate, a binder which rapidly *converts* to a solid after penetration, and a binder which is used in an amount which is *adequate* to mechanically hold the system together.

A consideration of these factors explains the outstanding results obtainable by the addition of certain drying oils to emulsion paints to obtain adhesion to chalky surfaces. Being molecular in nature, the liquid drying oil is able to diffuse through the micron size chalky particles to the substrate and establish adequate substrate contact. Other things being equal, drying oils of low viscosity are obviously preferred, for

*The Baker Castor Oil Co., Bayonne, N. J.

flow through the chalk capillaries is thereby facilitated and bridging due to too high viscosity is avoided.

Once penetration of the drying oil has been achieved, quick conversion to a solid binder is desirable. It is obvious that as long as the drying oil remains liquid, it will fail to provide adhesion. Preferably the conversion from liquid to solid should be as rapid as possible and it definitely should be completed *before another coat of oil-free emulsion paint is applied.* A little thought will show why this is so important. As long as the oil remains liquid, it can and will distribute itself through whatever particle systems are made available to it for inter-diffusion.

Take the case where a slow drying oil (dry time 48 hours) is added to an emulsion paint in an amount sufficient to penetrate a chalky surface and to adequately contact the substrate beneath. If a dry time of 48 hours were permitted, the resulting bond would be satisfactory.

However, if a second oil-*free* emulsion top coat were applied at the end of four hours (the first emulsion paint to all outward appearances would be dry), then a secondary distribution of the drying oil sets in as it starts to redistribute itself upward into the new top layer. In effect, the newly applied top coat drains the still liquid oil upward from the two lower particle layers, robbing them of a portion of their drying oil content and leaving the bottom chalky surface with inadequate binder.

This effect can be confirmed by experiment. It can also be confirmed by the fact that if the top layer of emulsion paint is made oil-*containing* rather than oil-*free,* this robbing of the chalky layer of drying oil does not take place (the demands of the top emulsion layer of paint are pre-satisfied with added oil) and satisfactory adhesion of the two coat paint system is obtained with the four hour coat systems.

The above theory also serves to explain why an unbodied DCO *without drier* gives questionable results (slow drying makes it vulnerable to oil-free subsequent coats), whereas with drier present, unbodied DCO rapidly converts to a solid binder so with overnight dry, a second (oil-free) top coat can generally be safely applied.

Other illustrative examples of the dominance of the three primary factors of through penetration, conversion (dry) speed and adequacy of binder in securing adhesion can be cited, but most cases are self-explanatory if the role of these three main influences are kept in mind.

Experimental Testing

The experimental data submitted here is based on findings which were developed as a part of a Baker laboratory research program devoted to a study of this bonding problem.

Adequacy of Binder

It was experimentally established in the laboratory at an early stage that when the weight of added drying oil falls below *half* that of the latex polymer in the system, inconsistent results or lack of adhesion occur. Hence, a weight ratio of 1 part drying oil to 2 parts latex polymer was set up as a *minimum* value for fulfilling the demands of binder *adequacy.*

Later, reports filtered in from the trade indicating that a recommendation of one quart addition of drying oil per gallon of latex paint to secure chalky surface adhesion was fairly common. This represents about a 1 to 1 ratio of drying oil to latex polymer. Since this was well on the safe side of what had been previously set as a minimum by laboratory test, and since it constituted an easy measuring unit for the home painters, it was adopted as a standard level of additive addition.

Numerous tests have been proposed for measuring binder penetration, but certainly the simplest, and possibly a test as accurate as any, is one which consists simply of placing a given weight (3 grams) of the latex paint on a filter paper (Whatman #2). At the end of a 24 hour period the filter paper is examined for binder penetration as evidenced by the oily ring which spreads outward from the central blob of latex paint.

Latex paint, unmodified with drying oil, shows no observable ability to penetrate into the interstices of the filter paper. Conversely, latex paint modified with drying oil usually exhibits a definite ability to diffuse oil into the paper. The extent of the penetration is a function of both the particular latex system being tested and the candidate drying oil being evaluated.

This test and the variation in results that can be expected are shown in Figure 1. The illustration represents the results obtained with seven nationally

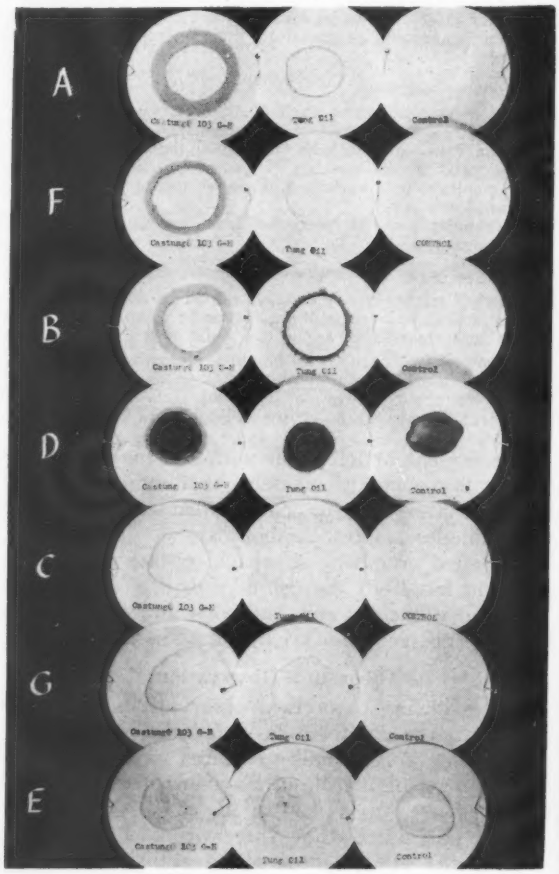


Figure 1. Binder penetration test of the various paints studied.

Table 1

Data on Commercial Latex House Paints for Exterior Wood Surfaces as Abstracted from Labels of Cans Purchased at Random from Dealer Stock in New Jersey/New York Area

MANUFACTURER	A	B	C	D	E	F	G
DESCRIPTION	Flat Exterior Paint	House Paint White	House Paint	Exterior House Paint	House Paint	Latex House Paint	House Paint Blister Resist.
LATEX TYPE	Vinyl	Acrylic	PVA*	Acrylic	Alkyd	Acrylic	Acrylic
DRY TIME	Rapid	.5 hour	<2 hour	—	<1 hour	Rapid	1-2 hour
FORMULATION (pbw)							
Pigment (%)	43.1	—	33.0	26.0	34.8	32.7	33.0
Vehicle (%)	56.9	—	67.0	74.0	65.2	67.3	67.0
Pigment Portion							
Titanium Dioxide, %	57.1	—	67.0	38.5	73.2	81.0	63.6
Silicates, %	7.2	—	13.0	23.0	6.7	12.0	36.4
Calcium Carbonate, %	35.7	—	20.0	38.5	—	7.0	—
Barium Sulfate, %	—	—	—	—	20.1	—	—
Vehicle Portion							
Non-volatile, %	22.6	—	31.5	28.0	30.2	23.5	38.0
Water, %	77.4	—	68.5	72.0	69.8	76.5	62.0
Time Lapse Between Coats	Same Day	—	2 hour	—	Overnight	Same Day	—

*Dealer verbal statement

advertised brands of exterior latex paints for wood as purchased over-the-counter from local paint stores. Descriptive details of these latex house paints as abstracted from the can labels are given in Table 1.

The generally excellent penetration throughout of an unbodied dehydrated castor oil (Castung® 103 G-H) is at once apparent. Tung oil is considerably less effective and in certain instances failed to exhibit any observable penetration. As expected, the control latex paints with no drying oil modification showed no diffusion whatsoever into the filter paper.

Dry Time of Binder

The dry time of the binder is critical. Either too short or too extended a dry time can cause trouble. Too short a dry time results in premature dry which interferes with or prevents the adequate penetration of the drying oil through the chalky surface down to the substrate. On the other hand, too slow a dry precludes the application of an oil-free second latex coat within a reasonable time period. Thus, unbodied DCO, *without drier*, provides too slow a dry extending the waiting period before application of a second (oil-free) latex coat to many days.

Fortunately, the drying rate of unbodied DCO can be stepped up by the use of driers. Based on experimental data obtained from testing both laboratory prepared and purchased latex paints, it is now believed that a drier system of .50% Pb and .05% Co based on Castung 103 G-H provides a drying oil and a dry time which are eminently suitable for latex paint modification.

Performance Evaluation of Commercial Paints

A severe stripping test was used for determining the adhesion of latex paints to chalky substrates. Details of this bonding test and the artificial chalk composition employed are outlined in turn. Because of the rigorousness of this test, it was found that the results obtained appear to question the use of raw tung oil even though tung oil has received some consideration by the paint industry for this application.

Bonding Test

A 1 mil wet layer of an artificial chalky composition is first drawn down over a glazed cardboard surface held flat by suction on a machined plane surface. When dry, films of the test emulsion paint, with and without one quart of the candidate drying oil per gallon of test paint, are drawn down over the chalked surface using a 7 mil blade clearance.

Following a stipulated drying period (70° F, 50% R.H.), masking tape (1 inch wide) is pressed tightly across the applied coating. The tape is then ripped off. Failure occurs when the coating is ripped off with the tape. Passing occurs when the coating remains adhered to the chalky substrate. This type of test is also used to evaluate the adhesion of two coat (latex) systems.

Artificial Chalk

The chalky composition used in the above test is formulated as follows:

	pbw
Water	300
Potassium Tripolyphosphate	3
Asbestine 3X (1)	375
Casein Solution (2%)	120
Defoamer (Carolina 581-B) (2)	1
Phenyl Mercuric Acetate	2

(1) International Talc Co., Inc.
(2) Carolina Colloids

Table 2

Adhesion of One and Two Coat Latex Paint Systems to Chalky Surfaces as Determined by Stripping Tests

	DRY TIME	LATEX MODIFICATION	A	B	C	D	E	F	G
ONE COAT SYSTEM (strip test conducted at end of specified dry time period)	20 hr.	Unmodified (Control)	←			F			→
		Tung Modified[1]	F	—	F	—	—	F	F
		Castung 103 G-H Modified[1] (with drier)[3]	P	P	P	P	P	P	P
	48 hr.	Unmodified (Control)	←			F			→
		Tung Modified	F	—	F	—	—	F	F
		Castung 103 G-H Modified[1] (with drier)[3]	←			P			→
	TIME ELAPSED BETWEEN COATS								
	5 hr.	Unmodified (Control)	F	—	F	—	—	F	F
		Tung Modified[1]	F	—	F	—	—	F	F
		Castung 103 G-H Modified[1] (with drier)[3]	P	—	F	—	—	F	F
TWO COAT SYSTEM[2] (strip test conducted 24 hours after application of second (oil-free) latex coat.	1 day	Unmodified (Control)	F	F	F	F	F	F	F
		Tung Modified[1]	F	—	F	—	—	F	F
		Castung 103 G-H Modified[1] (with drier)[3]	P	P	F	P	P	F	F*
	2 day	Unmodified (Control)	F	F	F	F	F	F	F
		Tung Modified[1]	F*	—	F	—	—	F	F
		Castung 103 G-H Modified[1] (with drier)[3]	P	P	P	P	P	P	P
	3 day	Unmodified (Control)	F	F	F	F	F	F	F
		Tung Modified[1]	F*	—	F	—	—	F	F
		Castung 103 G-H Modified[1] (with drier)[3]	P	P	P	P	P	P	P

F = Fails stripping test P = Passes stripping test — = Not run * = Slight
(1) Modification was at a level of 1 quart drying oil to 1 gallon of exterior latex paint.
(2) The second coat in all cases was the unmodified latex paint as purchased.
(3) Drier system was .50 Pb and .05% Co metal on oil base.

Evaluation of Adhesion with Drying Oil Addition

The same seven trade-sales latex paints used for the filter paper penetration test were also evaluated for chalky surface adhesion by this stripping test. The exterior house paints were evaluated as taken directly from the can and also as modified with Castung 103 G-H (with drier) and tung oil (both stirred in at a level of one quart of drying oil per gallon of latex paint). The tung oil was used as received (without drier) as recommended by outside publications. Attempts to upgrade the tung oil bonding through the use of drier proved ineffective, poor adhesion being obtained with or without drier.

Castung 103 G-H (a quality unbodied DCO) with drier is sufficiently low in viscosity to permit a ready stir-in into the latex paint. Of the latex paints checked to date, it has been found unnecessary to use any extra emulsifier (the emulsifier already resident in the emulsion paint has always been found fully capable of taking in the Castung 103 G-H). The fact that no added emulsifier must be introduced into the latex system is a distinct advantage, for any added emulsifier only complicates the formulation and weakens the film integrity.

Both one coat and two coat systems were investigated. Also checked was the effect of the time period between application of the latex coats. The results of this testing program are tabulated in Table 2.

An inspection of this bonding data reveals that modification with Castung 103 G-H (with drier) provides consistently effective bonding whereas the tung oil modified and the unmodified latex paint (as purchased) invariably failed to provide adhesion. *The superior performance of the Castung 103 G-H is attributed largely to its outstanding penetration properties.*

The results obtained with the two-coat latex systems reveal a very important finding, namely, that an adequate time period must be allowed to elapse before applying a second coat of latex paint (oil-free) over the first coat (oil-fortified). Overnight is generally sufficient but in several instances a two-day wait is necessary.

Figures 2 and 3 illustrate details of the tape-stripping test for a one- and two- coat system respectively.

In Figure 2 (one-coat system) two drawdowns of chalk (side by side) can be seen running lengthwise of the glazed cardboard substrate. Across (and over) these chalk strips, there have been drawn down, in turn, the control latex paint (unmodified), the latex

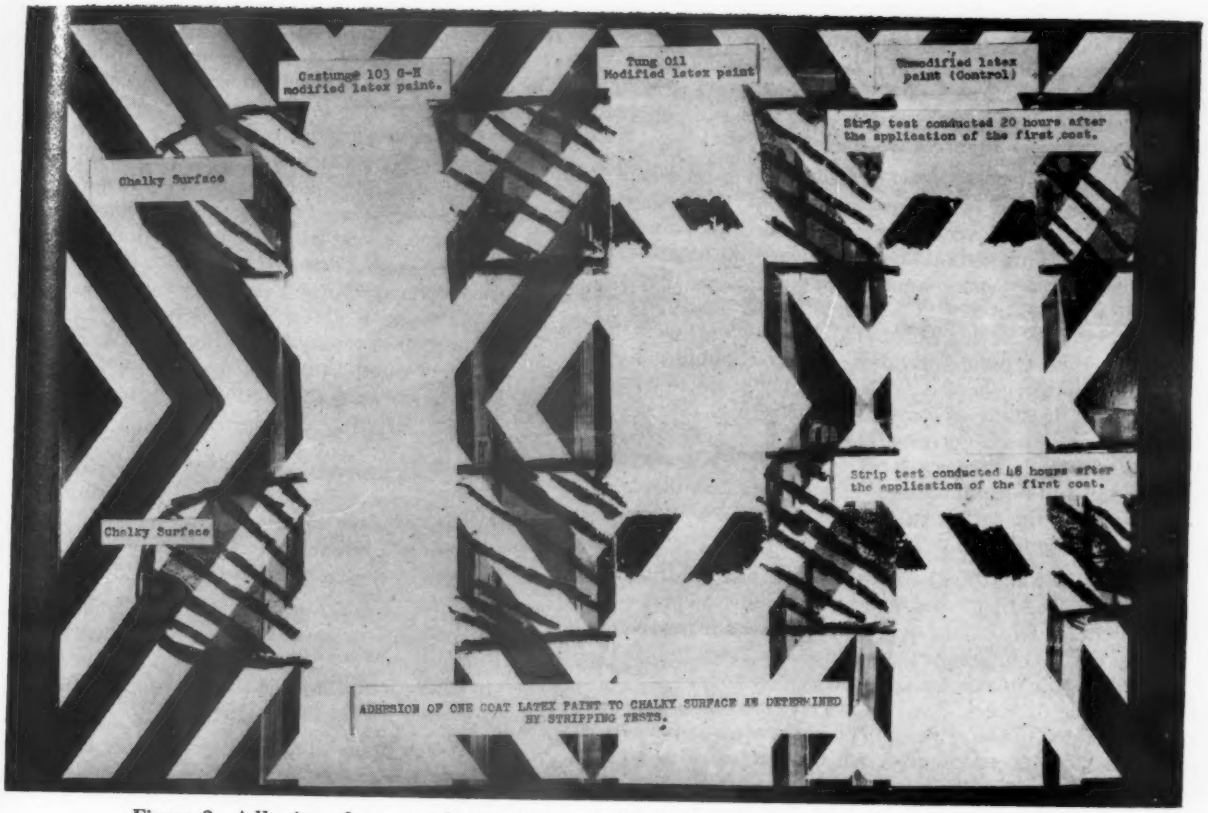

Castungo 103 G-H modified latex paint.
Tung Oil Modified latex paint
Unmodified latex paint (Control)
Strip test conducted 20 hours after the application of the first coat.
Chalky Surface
Strip test conducted 46 hours after the application of the first coat.
Chalky Surface
ADHESION OF ONE COAT LATEX PAINT TO CHALKY SURFACE AS DETERMINED BY STRIPPING TESTS.

Figure 2. Adhesion of one coat latex paint to chalky surface as determined by stripping tests.

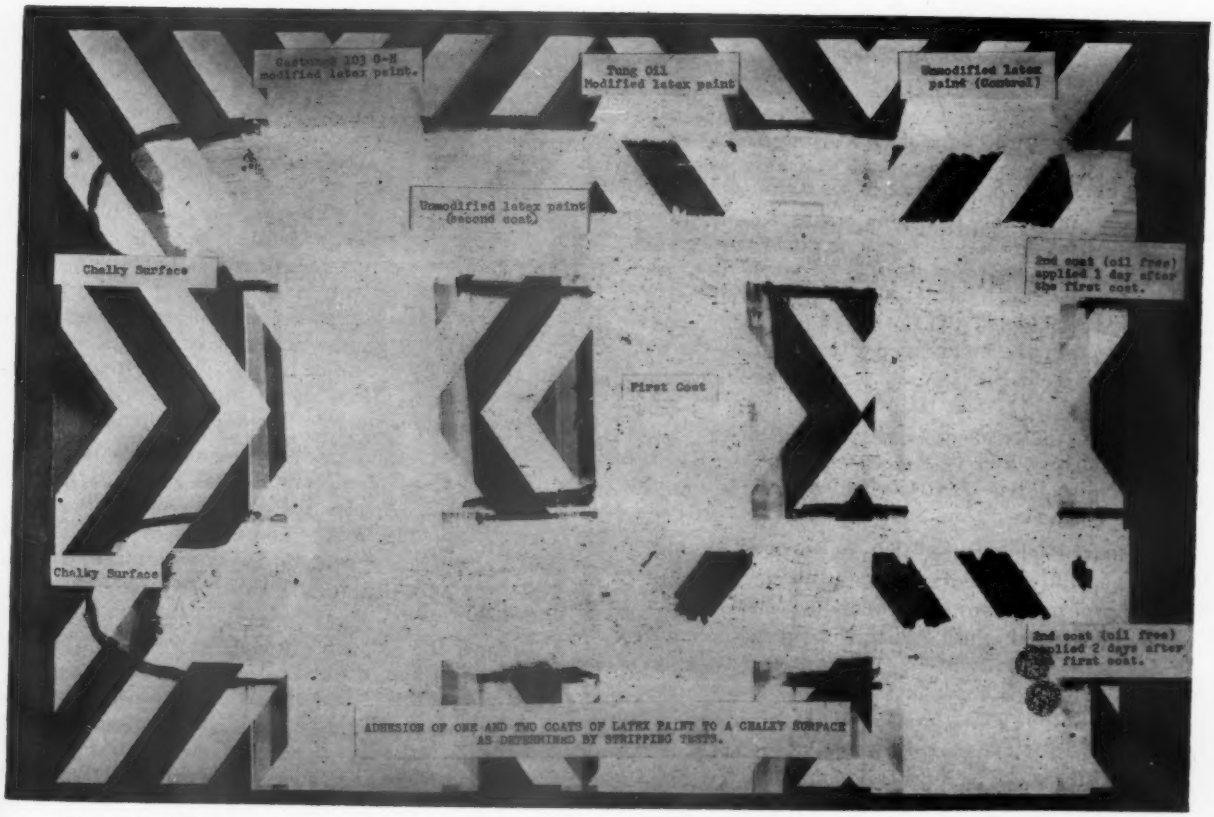

Castungo 103 G-H modified latex paint.
Tung Oil Modified latex paint
Unmodified latex paint (Control)
Unmodified latex paint (second coat)
Chalky Surface
2nd coat (oil free) applied 1 day after the first coat.
First Coat
Chalky Surface
2nd coat (oil free) applied 2 days after the first coat.
ADHESION OF ONE AND TWO COATS OF LATEX PAINT TO A CHALKY SURFACE AS DETERMINED BY STRIPPING TESTS.

Figure 3. Adhesion of one and two coats of latex paint to a chalky surface as determined by stripping tests.

modified with tung oil and the latex paint modified with Castung 103 G-H. The results of the tape-stripping test, as carried out after a one-day and a two-day drying period, are illustrated by the top and bottom sections of Figure 2 respectively.

Figure 3 (two-coat system) differs from Figure 2 in that a second coat of oil-free latex paint has been applied at right angles over the first coat of latex paint of Figure 2. This second coat is brushed on lengthwise of the chart and covers the same area as that covered by the initial chalk layer. Before applying the second coat, all deposit of chalk between strips is removed, thus avoiding any danger of contamination of the second brush coat with loose chalk particles during the brushing operation. The results of the tape-stripping test, corresponding to one and two days respectively between latex coats, are illustrated by the top and bottom sections of the chart (the tape-stripping test in each case was conducted 24 hours after the second brush coat was applied).

It is realized that final confirmation of the bonding action imparted by drying oil additives must be given by either test-fence data or by data derived from observing the performance of these modified latex paints as applied to exterior wood surfaces of homes in different areas of the U.S.A. However, it is also contended that if initial adhesion is lacking after application, there is no mechanism whereby it will or can develop adhesion with time. Hence, long-range testing is conducted essentially to determine the *retention of initial adhesion* with time. In this sense, the stripping test is valuable for it evaluates the effectiveness of initial bonding and makes sure that the latex paint starts off with a strong initial bond.

Although no Baker data is presently available relative to the natural aging of latex paints with Castung 103 G-H modification, it is argued that there is no reason to expect anything but favorable end results. From a yellowing standpoint, Castung 103 G-H is far preferable to a tung or linseed oil. In an accelerated aging test, where oil-modified latex paints have been subjected to a heating cycle, the tung and linseed oil variants have developed substantial yellowing whereas Castung 103 G-H does not appear much different from the unmodified latex paint at the end of the heat cycle.

Furthermore, it has been reported that Castung 103 G-H is an excellent house paint vehicle. Based on an exaustive four year aging study[1] of dehydrated castor oil in oil-based exterior white house paints, the following conclusion was reached.

> "It can be safely stated that, based on the results of this study, dehydrated castor oil can be safely and profitably used in white house paints. Benefits conferred during paint preparation and application are rapid processing, ease of application and fast drying. On long range performance, 100% DCO white house paints appear fully equivalent to linseed oil paints and in the important case of self-primed paint systems (applied over the most commonly used woods) DCO appears to contribute better durability."

The import of the last sentence of this conclusion is of more than passing interest for in a very definite sense, the added drying oil, by virtue of its penetration into the chalky surface, is establishing an oil-type undercoater beneath the latex paint wherein the chalk can be considered as pigmenting the oil bound layer. From the exterior testing with conventional house paints, it has been demonstrated that dehydrated castor oil is preferable for self-priming systems. Hence, it is argued that with a latex paint, dehydrated castor oil should also be preferable for binding the chalky surface together and providing an intermediate oil-bound chalk layer having adhesion and integrity.

(1) Patton, T. C., Off. Digest, September (1955) "Evaluation of Dehydrated Castor Oil in Exterior White House Paints"

Summary

The lack of adhesion of commercial latex paints to chalky surfaces has seriously retarded their extensive promotion for use on exterior wood surfaces. The most promising approach to overcoming this difficulty is through the use of a drying oil additive.

For a binder to be effective, it must be present in adequate amount, it must be able to penetrate the chalky surface and establish good contact with the substrate beneath and it must dry to a solid state in a reasonable time period (overnight).

Practical experimental data are submitted to verify and confirm these theoretical considerations based on laboratory-prepared and seven national brands of latex paint.

A rigorous tape stripping test is described. Testing was conducted on the seven trade-sales paints as purchased and as fortified by the addition of 1 quart of Castung 103 G-H (with drier) and 1 quart of raw tung oil, respectively, per gallon of the latex paint.

Both one and two coat systems were investigated. The Castung 103 G-H (a quality unbodied DCO) provided consistently effective bonding, whereas the tung oil modified and the unmodified latex paints (as purchased) invariably failed to provide adhesion. The superior performance of the Castung 103 G-H is attributed largely to its outstanding penetration properties. The results also point up the importance of allowing an adequate time period to elapse before applying a second coat of latex paint (oil-free) over a first coat (oil-fortified), (overnight is usually sufficient but in certain instances a two-day wait is necessary).

The tape-stripping test provides an excellent clue to initial bonding. Long-range testing on test-fences and houses is a necessary follow-up to demonstrate retention of this initial adhesion on aging. From analogy with conventional oil-based house paints, dehydrated castor oil should provide excellent aging performance for this type of latex paint modification.

Castung 103 G-H with driers (.50 Pb, .05 Co) is the drying oil of choice for securing adhesion of exterior latex paints to chalky wood surfaces, a selection made on a basis of proved performance (outstanding penetration, effective bonding), its known properties of minimum yellowing, superior flexibility, water resistance, and its demonstrated ability to excell in conventional self-primed oil-based house paints.

COMPARE

EASIER DISPERSING

ROMAN RED

DARK No. 1083

with any Bon Red or Maroon you're now using

Manganese—BON REDS have been known as hard colors to disperse, due to innately gritty texture. Roman Red No. 1083, Kentucky Color's newest development, provides a substantially softer product with 20% better strength, improved cleanliness and light-fastness. Roman Red 1083 has basically softer texture; it will disperse without difficulty to enamel fineness on a 3-roll mill. You can actually feel this softness . . .

You will best appreciate the greatly improved ROMAN RED #1083 properties by testing it yourself . . . Let us send you a sample . . . feel it . . . disperse it . . . COMPARE . . . YOU'LL LIKE THE RESULTS.

Call your local Kentucky Color salesman, or write the Louisville Office, 600 North 34th St., Louisville 12, Ky.

Kentucky Color
AND CHEMICAL COMPANY, INC.
Division of the HARSHAW CHEMICAL CO.

Got a real drying problem?

Why not try an isophthalic alkyd to solve those "hard-to-lick" air-dry problems. Isophthalic alkyds are fast-drying — in tack-free time and have definitely superior through-drying properties. Besides better drying qualities, isophthalic alkyds are superior in toughness, adhesion and resistance to impact and abrasion.

New test data now available! Address your inquiry to any Oronite office.

ORONITE CHEMICAL COMPANY
A CALIFORNIA CHEMICAL COMPANY SUBSIDIARY

EXECUTIVE OFFICES • 200 Bush Street, San Francisco 20, California
SALES OFFICES • New York, Boston, Wilmington, Chicago, Cincinnati, Cleveland, Houston, Tulsa, Los Angeles, San Francisco, Seattle
FOREIGN AFFILIATE • California Chemical International, Inc., San Francisco, Geneva, Panama

6407

By
Edward Anthony

The author expresses his random reflections on various aspects of the paint industry. The opinions contained in this column are his alone and do not necessarily reflect those of this publication.

Resin Pot-Pourri

A THIRTY-year-old-and-then-some recipe called for, roughly, equal parts of oil, glycerine and phthalic anhydride, plus a dash of litharge—stir well while boiling for six to eight hours—add an appropriate solvent, and, presto!—an *alkyd* resin! This certainly meets Webster's "pot-pourri" definition, "a dish of different things, cooked together." And it's still being done today but, more often than not, with some new ingredients.

For example, for faster dry add some styrene or vinyl toluene (or methyl methacrylate or acrylonitrile) to the pot (about one quart to the gallon will suffice); or to improve the salt spray resistance try some phenolic resin (only about one pound this time, though even half this amount will show a difference). But you can easily add other helpful ingredients after your alkyd has been cooked.

An imposing array these resins are, too: nitrocellulose, chlorinated rubber, poly (vinyl chloride-acetate), epoxy, silicone, urea- or melamine-formaldehyde, bodied oil, even isocyanate—each to perform a different function.

And so an alkyd resin would undoubtedly also meet Noah W.'s definition for "adaptability", too After all, many hundreds of millions of pounds—almost 400,000,000 last year!—are used, with a low bow to Smith, Kienle, et al.

Alkyd resin technology has kept pace with the vigorous advances in other phases of finishes development so that, just as 25 years ago, these film formers remain the workhorse of the industry and the backbone—either when used alone or in one of the numerous combinations described above—of the formulation of solvent based coatings. The past ten years has seen the introduction and promotion of new basic ingredients that are claimed to improve the end product; among an almost innumerable host of compounds mention might be made of such representative ones as benzoic acid, trimethylol ethane and propane, pentaerythritol, isophthalic acid, etc. Further, contributions continue to be made to basic formulative approach which enable the resin chemist to more fully exploit the raw materials at his command. Consider, for example, Kraft's "Molecular Approach to Alkyd Structure" (*Official Digest*, August, 1957), and Long's "Predetermined Designs of Resins" (*Official Digest*, January, 1960).

Alkyd Resins: an adaptable pot-pourri!

The Far, Hot Frontiers

AIRCRAFT—manned and unmanned — are continually going further and faster in man's hardly begun conquest of space. Each successive step increases the demands on the materials of construction of these space vehicles. The development of heat resistant polymers is receiving increased attention as a result of this program (so reports *Chemical Week*, March 12, '60). Long time stability at temperatures over 1000° F. is the goal of such research—but if you have a 500° F. material, bring it on!

These polymers are for surface coatings, reinforced plastics, lubricants, hydraulic fluids, adhesives, and the many other uses for which elastomers and plastics have proven to be invaluable. Such widely known types as the silicones, phenolics and epoxies are being investigated, along with such esoteric compositions as the phosphinoborines and fluoroamidines.

The government is currently betting about $30,000,000 (in research contracts) that such companies as duPont and Union Carbide—and numerous smaller ones—will develop a host of valuable new polymers.

Looking Backward

THE next time you do-it-yourselfers decide that a plaster wall needs re-doing and if you happen to choose a *water based* paint, consider the advances that have been wrought in the past 15 years. For it is from the far distant past of 3500 years ago that tempera painting—pigments carried in egg, casein or gum, applied to plaster—comes to us, with very little change until just a short time ago.

Today of course with tubes and jars, the artist merely has to add water to the commercial product to obtain an excellent medium suitable for many varied surfaces. Both the amateur and professional artist find tempera with its vivid colors very satisfactory as a means of expression. The highly developed color consciousness of Mr. and Mrs. Urban-and Suburbanite

finds particular pleasure in the "just a few hours and the room is redone and ready to use" type of modern day tempera painting—with a welcome change in vehicle.

The loudest kudos for the phenomenal success of *water based paints*—from a technical viewpoint, for the promotional geniuses certainly deserve a special commendation—would of course go to the emulsion vehicles. Starting with the butadiene-styrene blends which were an outgrowth of the World War II work on synthetic rubber, there followed the rapid commercial development of poly(vinyl acetate) latices—improved more recently by incorporating internally plasticizing monomers in the recipe—and the acrylic based types. These can be further modified by the addition of such dissimilar, but compatible, emulsifiable vehicles as petroleum resins, alkyds, and even tung oil!

Nor should Zola's tremendously popular lacquer-in-water "polka dot paint" be overlooked. And in the industrial finishes field the more common emulsions mentioned above are being given a run for the money by a host of new thermosetting emulsion and solution-in-water vehicles.

Looking backward? Looking forward!

Facts and Figures Dept.

THE American Chemical Society is the largest technical organization in the country, comprising almost 89,000 members. Some comparative figures shed considerable light on the relative position of the coatings industry with respect to employment of professional personnel. Thus, the Federation of Societies for Paint Technology has a membership of about 3820 (based on a fast toting up of the '59 membership list). The Paint, Plastics and Printing Ink Division of A.C.S. has less than half this enrollment, 1574; however, this number of individuals primarily interested in our industry who are also members of A.C.S. could be effectively increased by portions of the other divisions, particularly Polymer (with 1001 members). It should be noted that only about one-third of all A.C.S. members are enrolled in a specific division.

To obtain some idea of the relative position of the Paint Division, consider that it is ninth in membership among 22 groups. The largest is Organic (3921), second is Analytical (2972).

Chemical Abstracts, the standard of the field, noted 422 papers in the classification of "Paints, Varnishes, Lacquers and Inks"—about 0.5% of the total for last year. There were 661 patents in this area, about 2.5% of the total. These figures can be augmented by the contributions to our industry listed under such other groupings as "Synthetic Resins and Plastics" and "Rubber and Other Elastomers".

These figures were taken from A.C.S.'s annual report for 1959, *Chemical and Engineering News*, March 7, 1960.

In this issue too is the summary of a survey conducted by the University of Toledo for the U. S. Office of Education, concerning equipment — or lack of it — for teaching science in high school. The report covered 855 schools in seven states, with 233,000 science students. The average budget for supplies and equipment for each of these students was only $2.66 last year! Science teaching equipment was rated as "good" in only 20% of the schools for biology, physics and general science; chemistry fared somewhat better, 34%.

This points up the true need for such aid as the paint industry has given—and hopefully will increase—through the annual summer Short Course for High School Chemistry Teachers, and the many endeavors of the Educational Committee of the Federation (particularly PEAK—Paint Educational Aids Kit).

Paint—1960

I HAVE a bone to pick with the United States Department of Commerce—Bureau of the Census, to be exact! Question H6 of the 1960 census (and it's a "Census of Population *and Housing*") requires the Enumerator's evaluation of every dwelling building's condition — "sound" — "deteriorating" — "delapidated" — and the paint job doesn't enter into consideration at all! Specific instructions caution the Enumerator *not* to be deceived by a fresh coat of paint on a structure that has seen better days; also to be wary of "tattle-tale gray" first impressions, to see through (?) this outward appearance in his or her evaluation. While this might be justified semanticly, practically speaking if you also consider Question H15 — "About how much would this property sell for on today's market?"—the outside (and inside) appearance certainly would make a difference.

The fantastic dollar value appreciation of the 15 years of the post-war era have left their mark on real estate along with almost everything else. A good portion of this is provided by the impetus of our rapidly increasing population; the current rate of increase is about 3,000,000 persons each year! New housing starts are over 1,200,000 units a year; over $5 billion is being committed this year for construction (residential, non-residential and public)! These growth figures are tremendously impressive. They indicate also the magnitude of the paint industry's market. Each and every one of these buildings will require some paint, whether it be on the walls (inside and/or out), on the machinery inside a factory, or on the furniture and appliances in a home.

The total of trade sales and industrial paint sales will probably be something less than $2 billion this year; that of all chemical products about $27 billion ("guesstimating" from the U. S. Dept. of Commerce figures for 1959 and predictions for '60). The encroachments of other methods of protection and decoration—"built in", as with plastics; "new", such as vinyl clad metal—have certainly affected paint sales to some degree, though reliable estimates are hard to come by.

General Battley's yearly exhortations at the Convention set a hopeful note for each coming year. The inexorable march of technological advance is impossible to fight; it must be joined. One can take hope considering that "status symbols" do change, but the most continuingly successful of all of these indicators of social strata (oh! the jargon the experts do indulge in!) is still a gleaming, freshly painted home (B. of the C. not withstanding!).

NEW HALF SECOND BUTYRATE/RESIN COMBINATIONS PRODUCE SUPERIOR COATINGS

Half-Second Butyrate has become widely accepted among lacquer formulators as a major film-forming material. Coatings based on it are noted for their low color, nonyellowing characteristics, toughness, flexibility, outdoor durability and high gloss.

Now even greater advantage can be taken of these properties. For recent work has shown that a number of important resins not generally considered in the formulation of Butyrate coatings can in fact be combined with Half-Second Butyrate to produce finishes of outstanding performance.

In many of these finishes, Half-Second Butyrate serves as a modifying resin; in others, it is the basic film-former. In either case, the combination results in coatings whose properties are significantly superior to those obtainable from either resin alone.

The characteristics of a number of these combinations are described here.

HSB/Amino *Amino* resins modified with Half-Second Butyrate produce lacquers of increased toughness, improved sprayability and flow-out, more rapid air-dry and outstanding weather resistance. Half-Second Butyrate modified with amino resins, on the other hand, offers improved adhesion and abrasion resistance, and increased heat and solvent resistance. In both cases, the amino resins crosslink with the hydroxyl groups on the cellulose acetate butyrate molecule.

HSB/Epoxy *Epoxy* resins of low molecular weight are used to modify Half-Second Butyrate to produce coatings with improved adhesion. In epoxy-butyrate-amino formulations, the epoxy resin acts to stabilize the system, increasing its storage stability significantly. Such formulations exhibit great toughness and flexibility.

HSB/Polyurethane *Polyurethane* systems show improved build and better flow characteristics with the addition of a Butyrate resin such as EAB-381-20. This resin has a higher viscosity than has Half-Second Butyrate.

HSB/Silicone *Silicone* resins, when added to Half-Second Butyrate formulations, further improve their outdoor durability and high gloss retention characteristics.

HSB/Acrylic *Acrylic* resins, in combination with Half-Second Butyrate, show improved film performance in several ways over formulations based on acrylics alone. Use of Half-Second Butyrate builds solids content, improves sprayability, and imparts better solvent release characteristics. In addition, the coating is tougher and shows better weather resistance and gloss retention. The excellent adhesion and alkali resistance of Butyrate-acrylic formulations suggests their use on exterior structural aluminum.

HSB/Maleated vinyl *Maleated vinyl* resins may be used—and only relatively small amounts are required—to improve the initial toughness and adhesion of Butyrate-acrylic films.

HSB/Oil-free alkyds *Oil-free alkyds*, when incorporated in Half-Second Butyrate formulations, serve to improve adhesion and toughness.

HSB/Polyester *Polyester* resins can be modified with up to 15% Half-Second Butyrate. The addition of Butyrate resins promotes leveling and brings about a sharp reduction in tack-free time.

The results of these studies of Butyrate/Resin combinations are discussed in detail in Eastman's **"Formulator's Notes 0.3."** Starting formulations are included. Write or call the nearest Eastman sales office for your copy.

HALF SECOND BUTYRATE
an Eastman film-former

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; Atlanta; Chicago; Cincinnati; Cleveland; Detroit; Framingham, Massachusetts; Greensboro, North Carolina; Houston; New York City; Philadelphia; St. Louis.
West Coast: Wilson & Geo. Meyer & Company, San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

SOME PERFORMANCES HAVE NEVER BEEN EQUALLED—

STANDARD FOR SKYSCRAPERS—Reaching majestically 102 stories and 1,250 feet into the sky, the Empire State Building is the world's tallest. In addition, a 222-foot television antenna towers above the building. Revolving searchlights installed on the 90th floor can be seen 300 miles away. More than 1,000,000 people visit the observation floor annually.

Look at Pine Oil

Someday someone may build a taller building than the Empire State Building —but it hasn't been done yet. And someday someone may invent a better all-round blending ingredient where high solvent performance is required.

Pine oil, of course, adds much more. Its wetting properties, bactericidal properties, and safety are well-known.

Pine oil, which has been in short supply for many years, is now readily available due to increased productive capacity. Look to Hercules for all the pine oil you need.

Just look at Hercules® pine oil's performance as a high-powered solvent:

	Kauri-Butanol Value
Pine Oil	**500+**
Toluol	105
Naphtha, H.A.	95
Turpentine	55
Naphtha, VM&P	34
Mineral Spirits	32
Kerosene	23

When everything is considered, pine oil still remains an outstanding ingredient for many diversified uses.

Pine Chemicals Division, Naval Stores Department

HERCULES POWDER COMPANY
INCORPORATED

900 Market Street, Wilmington 99, Delaware

NY60-1

NEW from Velsicol Research...W-617 HYDROCARBON RESIN EMULSION

A WHOLE NEW PAINT PRODUCT IDEA!

The versatility of Velsicol's W-617 for emulsion base paints makes it the ideal choice for progressive firms seeking profitable new paint products as well as important cost reductions on present products.

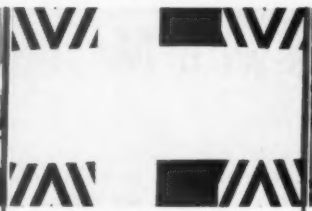
THESE PROVEN FEATURES GIVE YOU THE FACTS:

WATER SPOT RESISTANCE

W-617 films have maximum water repellency and minimum re-emulsification advantages created by the non-polar nature of the hydrocarbon base polymer and a specially developed wetting agent system.

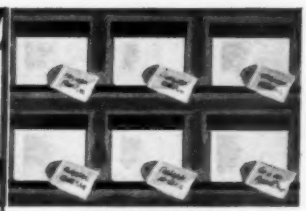
SCRUB RESISTANCE

Pigment binding power plus W-617's water resistance feature makes possible paint films that develop optimum scrub resistance rapidly, giving you a really quick drying and very hard wearing paint film.



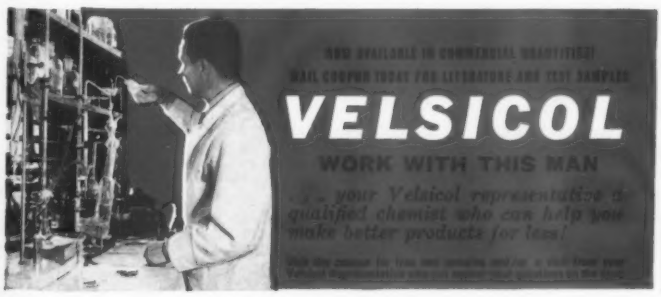
TOP HIDING POWER

W-617's high critical pigment volume concentration produces durable films with low specular gloss. Its low angle sheen gives maximum coverage and hiding of under surface imperfections.



SHELF STABILITY

Continuing tests, after 18 months showed that Velsicol W-617 as the sole vehicle or, used with polyvinyl acetate, styrene butadiene or acrylic latexes have good stability properties under standard storage conditions and under the Federal freeze/thaw specifications.



VELSICOL

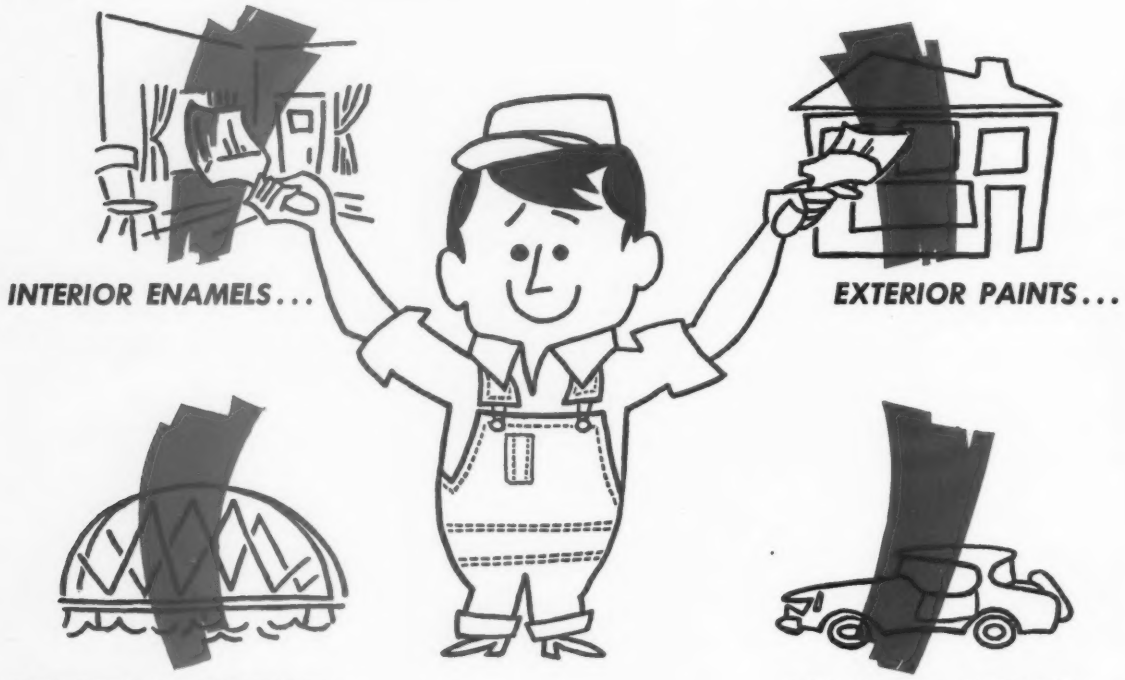
VELSICOL CHEMICAL CORPORATION
330 East Grand Avenue, Chicago 11, Ill.
International Representative: Velsicol International Corporation, C.A.
P.O. Box 1687 • Nassau, Bahamas, B.W.I.

☐ Please send a test sample of W-617
☐ Please have a salesman call.

PVP-60

Name_____
Company_____
Address_____
City_____ Zone_____ State_____

Whether you make Alkyds for:



Specify PITTSBURGH Intermediates for Top Quality Finishes with Maximum Customer Appeal

If you make alkyd resins or finishes, it will pay you to specify high purity phthalic anhydride, maleic anhydride and fumaric acid from *one* dependable source—Pittsburgh Chemical.

Pittsburgh quality-controlled intermediates make it a lot easier to consistently produce finishes with superior color and gloss retention, ease of application, durability and fast drying.

Pittsburgh Phthalic maintains good molten color stability over long periods and requires no special alloy steels for handling. It is essentially free of maleic anhydride and benzoic acid, thus insuring uniform reaction rates and reduced product variations.

PITTSBURGH CHEMICALS FOR THE PAINT INDUSTRY

Phthalic Anhydride • Maleic Anhydride • Fumaric Acid
Benzol • Toluol • Xylol • DiButyl Phthalate • Phthalocyanines

The next time you need intermediates, order from Pittsburgh Chemical. You'll save money in paper work and reduce freight costs by ordering mixed carload shipments. And you'll *like* doing business with *one* efficient, coordinated sales and service team, familiar with your operations and requirements. *Call Pittsburgh Chemical today!*

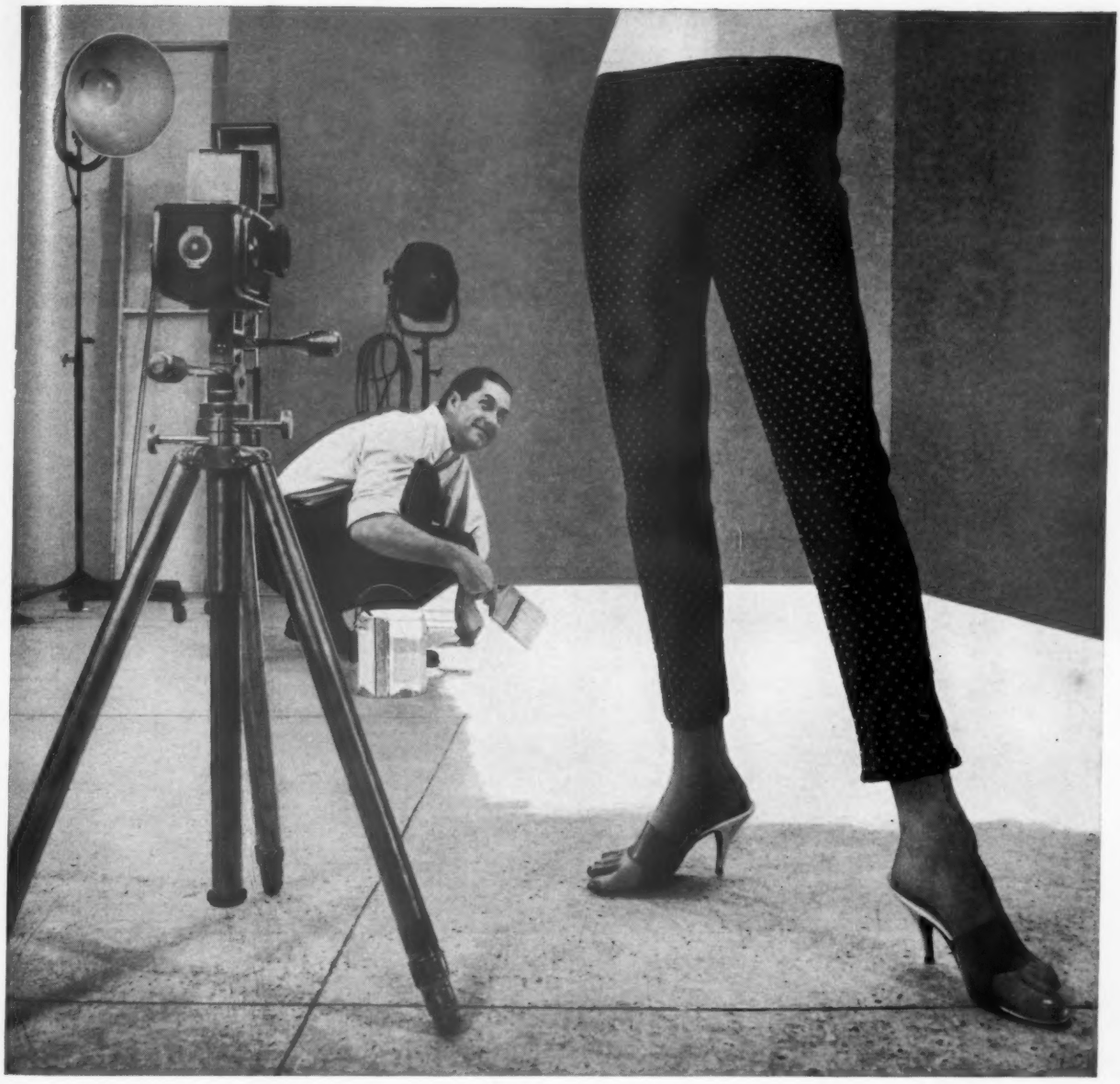
INDUSTRIAL CHEMICALS DIVISION

PITTSBURGH CHEMICAL CO.

GRANT BUILDING PITTSBURGH 19, PA.

A Subsidiary of PITTSBURGH COKE & CHEMICAL CO.

1212



TITANOX® can brighten your picture, too...

. . . whether you're a photographer applying flat white paint to a studio floor to provide high diffuse reflection . . . or a paint formulator looking for a way to improve the quality of your flat white paints at an attractive cost.

TITANOX white titanium dioxide pigments are established favorites in the paint industry for making flat white paints. For organic solvent types, TITANOX-RCHT (30%TiO_2) and TITANOX-C-50 (50%TiO_2)—both carrying their own extender for most effective dilution of rutile titanium dioxide—give the highest brightness and hiding at lowest cost. For emulsion flats, easy dispersing, high-hiding TITANOX-RA-50 rutile "pure" titanium dioxide is preferred. Not only for whites, but for tinted flats too, these pigments fit the most exacting production schedules and paint quality requirements.

For all types of coatings, from the flattest flat to the sharpest gloss, one or more types of TITANOX are always in the paint manufacturing picture. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; offices and warehouses in principal cities. In Canada: Canadian Titanium Pigments, Ltd., Montreal.

TITANIUM PIGMENT CORPORATION
SUBSIDIARY OF NATIONAL LEAD COMPANY

TITANOX

7788

For enamels that must stand heat

Prolonged baking and high service temperatures have little effect on the color retention of enamels made with UFORMITE MX-61 triazine formaldehyde resin. And because it is compatible with a wide range of DURAPLEX alkyd resins and other film formers, UFORMITE MX-61 can be used in a variety of baking enamel formulations for ironers, electrical heaters, fluorescent lamp fixtures . . . wherever heat is a problem.

In addition to resistance to heat-discoloration, UFORMITE MX-61 produces exceptional gloss, adhesion, and resistance to detergents and soaps.

Low viscosity makes UFORMITE MX-61 ideal for high solids, one-coat enamels. It is easy to use and handle. Write for technical data on UFORMITE MX-61 and the many other UFORMITE grades.

UFORMITE and DURAPLEX are trademarks, Reg. U.S. Pat. Off. and in principal foreign countries.

Chemicals for Industry

ROHM & HAAS COMPANY

THE RESINOUS PRODUCTS DIVISION

Washington Square, Philadelphia 5, Pa.

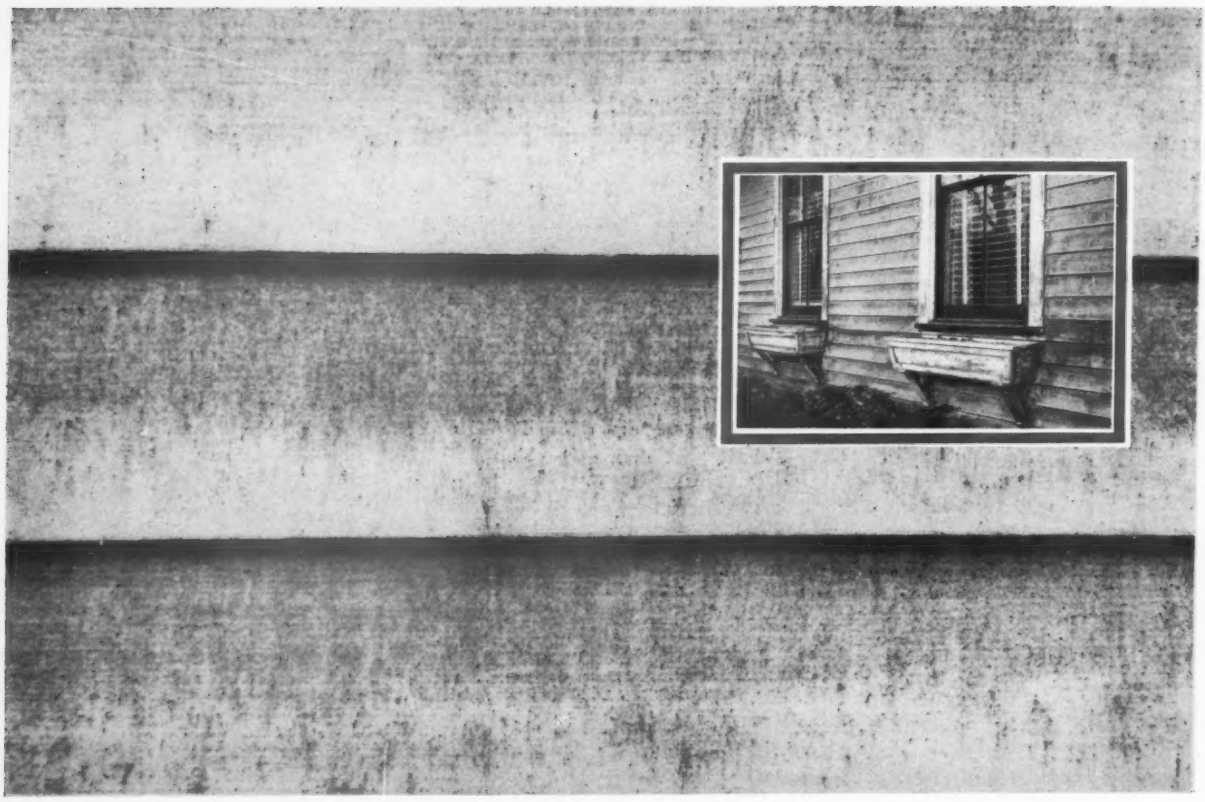
UFORMITE MX-61

foreign developments

1960
OCCA Exhibit

Soviet, Polish and
Czech Abstracts

Over 7,000 attended the 12th Oil & Colour Chemists' Association Exhibit. Twenty-two foreign countries were represented. For highlights of this annual British show, see page 61.



MILDEW

Did this to a freshly painted house in New Jersey

These pictures could have been taken in the Bayou Country of Mississippi, but they *were* taken in New Jersey just two months after this house was painted. The owner is suing the painter. The painter is unhappy with his supplier. And the supplier is frustrated too because the paint was of a good quality. Nevertheless, it deteriorated to the condition in which you see it owing to the destructive effects of mildew.

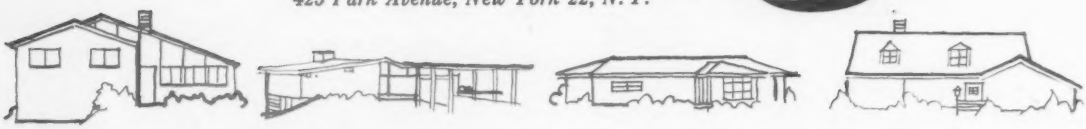
Formerly considered a Southern problem exclusively, mildew fungus now flourishes in the North as well as the South owing to prevailing conditions. Air-borne mildew spores can develop wherever there are high average temperature and humidity, subdued light (as on the north side of a structure), and food. Raw wood and the organic oils in paint both sustain mildew growth. When new paint is attacked, it is usually *from underneath* because it was applied to a contaminated surface. The result is discoloration and actual destruction of parts of the coating. This process can start during any damp spell in summer.

Fortunately, mildew can be prevented easily and inexpensively with *Nildew*, a tried and proven fungicide. For complete, long-lasting protection, add it to paints and primers, both, during their manufacture. A little of it goes a long way! Therefore, Nildew adds only pennies to the cost of paint—and dollars to its sales appeal. In areas where it is not commonly used, it offers paint manufacturers a new competitive advantage.

Nildew solutions are clear and light-colored—stable in storage—free from precipitation at low temperatures, assuring continued activity throughout the mixture. They are adapted to water- and oil-based paints both and have no adverse effects on the quality of coatings. For further information about Nildew, get in touch with Naftone! Telephone: PLaza 1-5544.

NAFTONE INC.

425 Park Avenue, New York 22, N. Y.



Highlights of

12th OCCA TECHNICAL EXHIBIT

Water soluble resins, colored titanium pigments and polyesters feature British show.

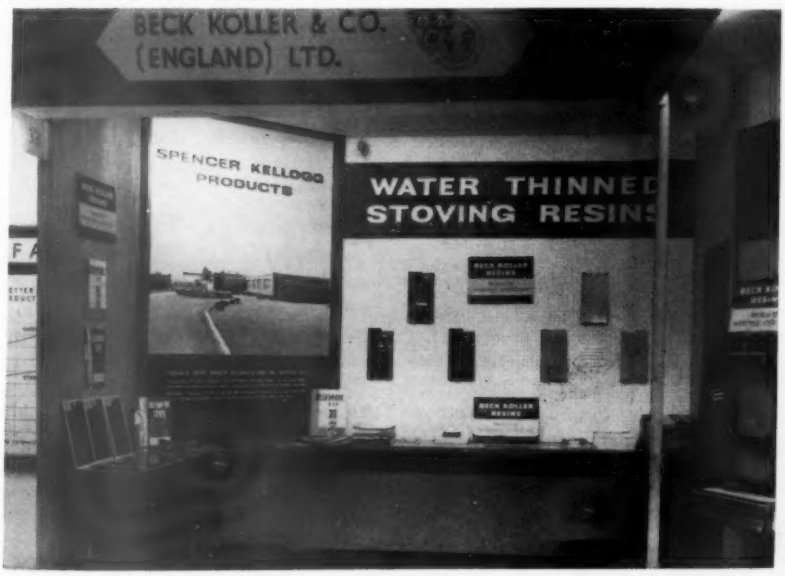
LAST year at this show the Archer-Daniels-Midland 'Arolon' finishes were shown as the first water-thinned materials to reach the British market. Since then firms have made great efforts to bring out their own products or to come to agreement with foreign firms to import or manufacture such new resins in Britain. Half a dozen booths at the exhibition this year featured water-dispersible or water-soluble resins and oils for both baking and air drying coatings.

Water-Soluble Resins

Apart from the other well known American finishes (Reichhold and Spencer Kellogg products for example, shown by Beck Koller), there were the notable Resydrol water-soluble resins licensed by Vianova Kunstharz A. G. of Austria for production by Cray Valley Products. Resydrol P411 is a phenolic-modified alkyd type and M470 and 471 are melamine-modified alkyd types, the latter having no tendency to yellow on baking.

Scott Bader & Co. is making several types of resin. These include Texicryl PS351 and 352, which are crosslinking acrylics, and there are other acrylics for blending with melamine resins. Texicote polyvinyl acetate emulsions are similarly blended with an amino resin for baking. The most important of the Scott Bader finishes for metal finishing are the polyvinylidene chloride water-thinnable binders and the firm considers that these are probably the most economical at the moment. British Resin Products, Ltd. has been carrying out an extensive program of research at its laboratories in Wales to develop water-soluble resins and one binder, Epok A1700, and its applications were described on the stand. If the amount of research being being carried out is a true indication of progress in water-thinned, next year will see many new and improved materials.

The prospects for water-thinned air drying paints seem less certain than for the baking enamels. Younghusband Stephens has developed a modified drying oil, Wybesol 1, possessing excellent air drying properties and water resistance when dry. The oil is also soluble in



In addition to the products of their associates in the United States, Beck Koller & Co. exhibited two new thixotropic alkyds.

The Goodyear exhibit was devoted entirely to the Plioloite S5 and VT Resins. Products attracted a great deal of attention among British paint manufacturers.

most of the common solvents so that it can be used as a grinding oil for universal tinters. It may be employed also as an additive for synthetic latex and other emulsions to improve flow, flexibility and adhesion to a variety of surfaces. Wybesol can replace wetting agents during grinding and dispersing since it loses its wetting characteristics on drying unlike known wetting agents.

Colors

Colored titanium pigments of local origin were seen for the first time this year. Two firms, Johnson, Matthey & Co. and Laporte Titanium, have produced titanium nickel yellows which they believe are superior to the similar pigments that have been in existence for some time. These new pigments have a strong lemon yellow color and, like rutile titanium dioxide, have excellent stability to heat, light and chemicals with equal non-chalking behavior on exposure.

Another really new pigment from Johnson, Matthey & Co. is a titanium green. This has been obtained by striking a phthalocyanine dye on titanium nickel yellow. Separation and flotation of the dye is said to be impossible. Phthalocyanines are very stable dyes so that the combination has almost as good properties as the original yellow pigment. These titanium pigments are stable enough for use in silicone paints but the main outlets will probably be in emulsion paints and in pale cream and yellow baking enamels of high covering power, e.g. for auto finishes.

Polyesters

The O.C.C.A. Exhibition is devoted to the products of raw materials manufacturers; as a result it cannot possibly give a complete picture of the paint industry it serves. This is particularly true where unsaturated polyester lacquers are concerned. Farbenfabriken Bayer, Badische Anilin- und Soda-Fabrik and a few other firms were showing polyester resins, and British Resin Products had a new wax-free polyester. However, several furniture firms are known to be using their own resins and the same applies to at least two paint manufacturers. The general impression in the furniture trade is that the usage of polyester lacquers is rising slowly, and many agree that there are many problems to be solved.

Alkyds and Oils

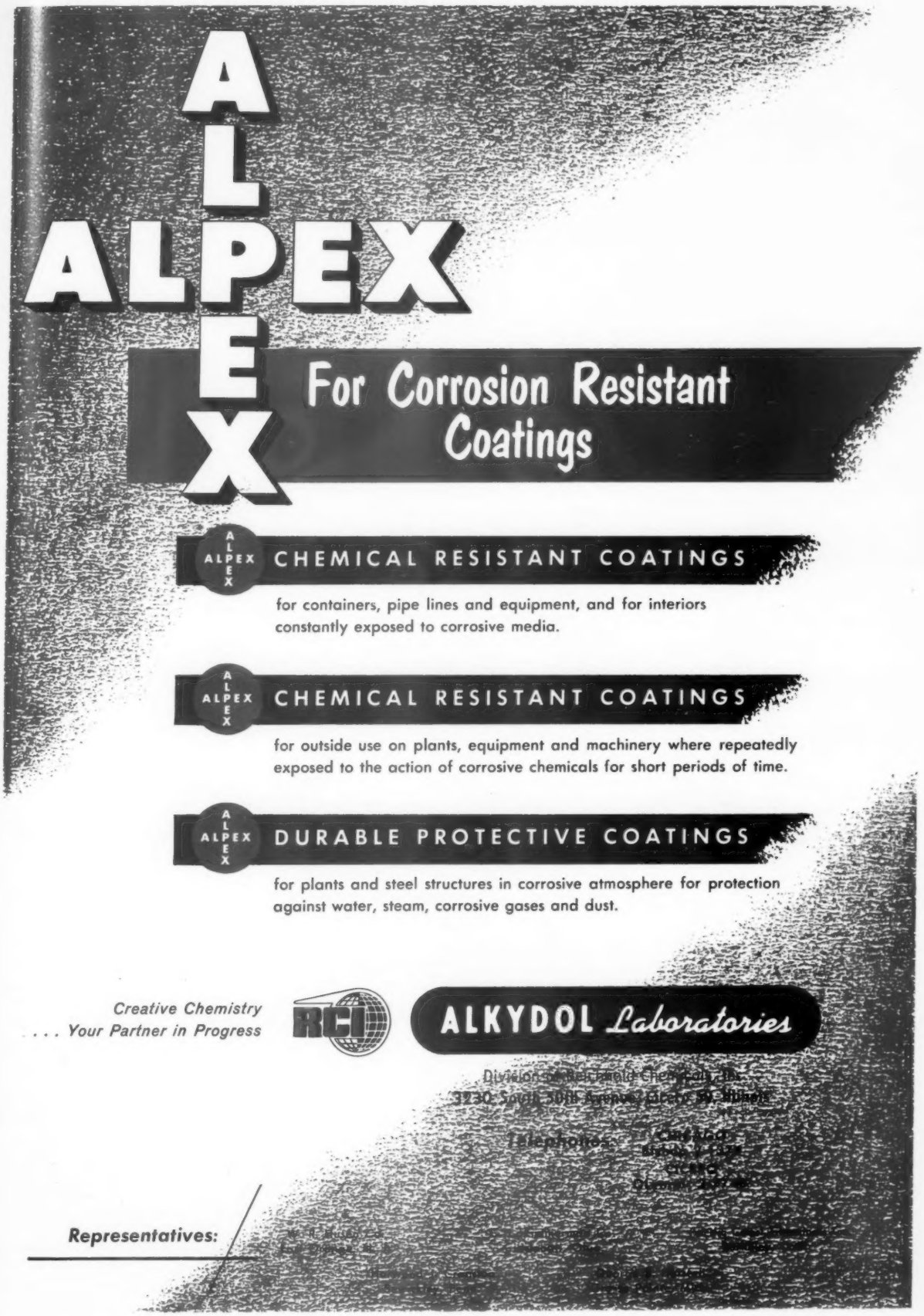
In spite of all the new products to be seen at the exhibition and mentioned here, the most lasting impression gained from looking at the stands is the overwhelming supremacy of the alkyd resin after thirty-odd years. In the architectural paint business the straight drying oil-glycerol-phthalic anhydride probably has no serious challenger. The variety of possible industrial finishes increases from year to year however, due to new permutations of the three companies. Trimethylolpropane is the only contender at the moment for the place of polyalcohol in the alkyd molecule. It was the subject of an exhibit by Imperial Chemical Industries and both Beck Koller and B.I.P. Chemicals had trimethylol alkyds on display (for cellulose and amino resin combinations respectively). Isophthalic alkyds are creeping in slowly in view of the shortage of phthalic anhydride.

It is, however, in the field of oils and fatty acids that a great deal of unspectacular progress has been made. Better defined oils and acids are available now than at any time. The oil in an alkyd today can be any one of a wide range of drying and non-drying oils that includes castor, hydrogenated castor dehydrated castor, coconut, ground nut, palm kernel, sunflower and tobaccoseed oils as well as the familiar linseed, soya, tall and tung oils. Most of the fatty acids are available as methyl esters from refiners like Younghusband Stephens and Victor Wolff, Ltd. In addition pure individual acids can be obtained. Armour Hess Chemicals offers behenic, stearic, palmitic, lauric, myristic and caprylic-capric acids while Universal Oil Co. have a similar range that includes erucic acid and distilled linseed fatty acids.

•

Canada Colors Forms New Plastics Department

Canada Colors and Chemicals Limited, has announced the formation of a Plastics and Development department within the company. Canada Colors and Chemicals is well known in the chemical industry, and the expansion of its activities into the field of plastics has now made necessary the establishment of a separate group to provide efficient service to the plastics industry. This group will be responsible for the development of sales of plastics and other raw materials to the plastics and allied industries, and will function in cooperation with the chemical sales group of the company through the district sales offices. All personnel assigned to this group are thoroughly qualified and experienced to ensure competent service to manufacturers and compounders of plastics.


ALPEX
For Corrosion Resistant Coatings
ALPEX CHEMICAL RESISTANT COATINGS
for containers, pipe lines and equipment, and for interiors constantly exposed to corrosive media.
ALPEX CHEMICAL RESISTANT COATINGS
for outside use on plants, equipment and machinery where repeatedly exposed to the action of corrosive chemicals for short periods of time.
ALPEX DURABLE PROTECTIVE COATINGS
for plants and steel structures in corrosive atmosphere for protection against water, steam, corrosive gases and dust.
Creative Chemistry
. . . Your Partner in Progress
RCI
ALKYDOL Laboratories
Representatives:

WITCO PAINT CHEMICALS ARE IDEAL IN ANY KIND OF PAINT

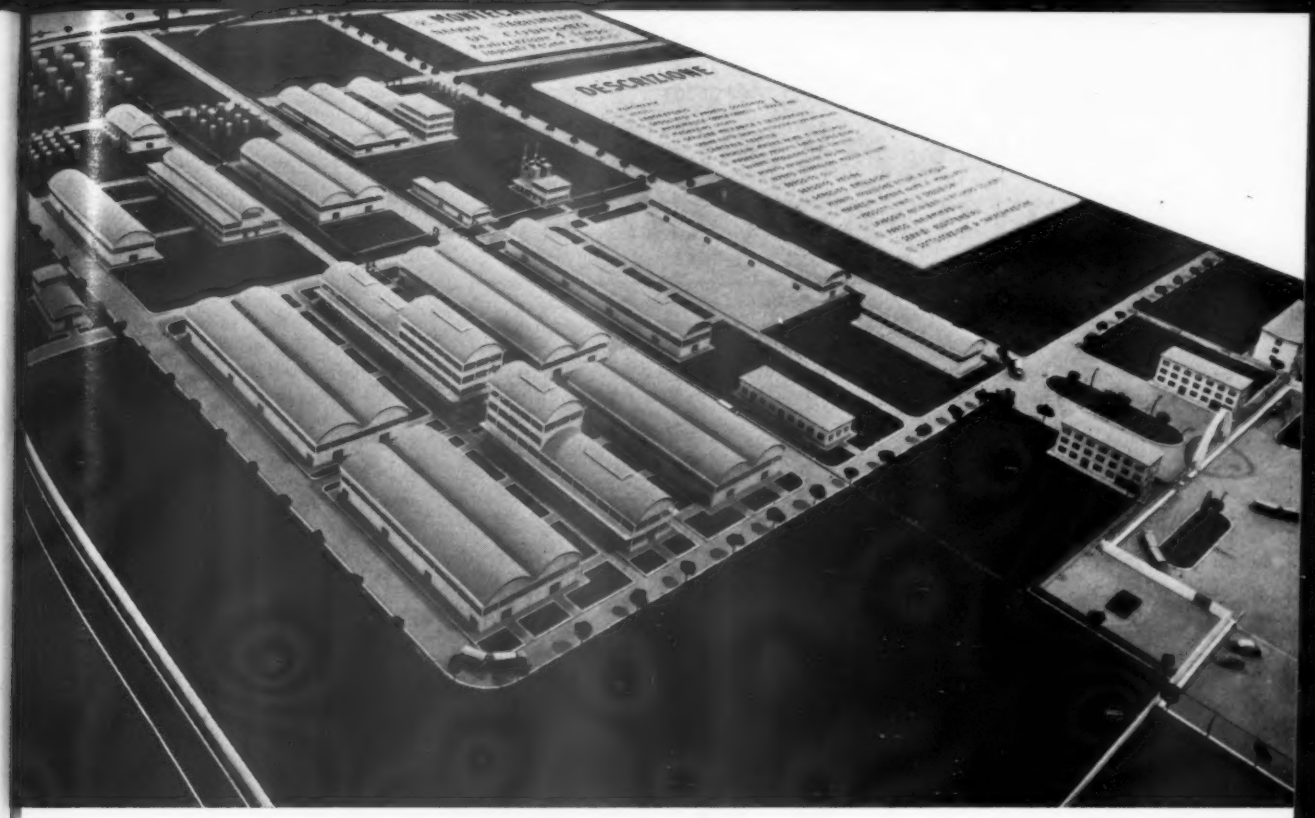
If you formulate paints or protective coatings, you'll find Witco chemicals help make your products better. Witco manufactures a full line of driers, including Naphthenic, Octoic, Tallate and Emulsive®. Two separate, strategically located plants assure a constant, uniform supply of these quality driers. Witco also offers the broadest line of metallic stearates available. They provide paints with superior flatting, pigment suspension and anti-sagging properties.

Witco manufactures its paint chemicals under strictest production control to insure uniform quality and outstanding performance. So if you're looking for quality paint chemicals, look to Witco for: DRIERS • METALLIC STEARATES • EXTENDERS • EMULSIFIERS • SURFACE ACTIVE AGENTS • PLASTICIZERS • PHTHALIC ANHYDRIDE • CARBON BLACKS

WITCO CHEMICAL COMPANY, Inc.

122 East 42nd Street, New York 17, N.Y.

Sales offices in: Chicago • Boston (Quincy) • Akron • Atlanta • Houston • Los Angeles • San Francisco • Toronto and Montreal, Canada (Soden Chemicals Division) • London and Manchester, England • Glasgow, Scotland • Rotterdam, The Netherlands • Paris, France



In Milan, Italy

Montecatini Plans Paint Plant

THE new Italian paint and varnish plant now being built by Montecatini at Codogno (Milan) will be the largest establishment in Europe and one of the most important in the world concerning the manufacture of synthetic resins. To start production this year, its first output will cover over 50 percent of national needs. Also, a vast array of new type paints and varnishes developed in the Montecatini laboratories will make it one of the major suppliers of both European common market and foreign, overseas countries.

Consumption of varnish per head of population has, until recently, still left Italy far backward among other European countries. Italians consume some 2½ kilograms of varnish and paint per capita yearly, as compared to the United States, Britain and Holland with consumption ranging from 16 to 20 kgs. per head of population. But the improvement in quality as well as the steady drop in prices is rapidly leading Italy to join the ranks of other major paint and varnish consuming countries today, and Montecatini experts of the new Codogno plant estimate this establishment will enable Italy to reach the comparative level of Holland within the next two years.

The new Codogno plant will, in addition to producing paints and varnishes, work on petrochemical by-products destined not only to the national market—textiles, paper, wood and construction industry—but service the common market in all fields of interest to this type of new industrial development.

Consumption in Italy of paints and varnishes today amounts to 130-150.000 tons a year, needing 37.500 tons of pigments, 60.000 tons of binding materials and 52.500 tons of solvents, sufficient in quantity to fill 7.500 trucktrains. In this sum total, national production has, until the creation of the Codogno plant, lagged behind and been based mainly on imports from Germany, Britain and the United States.

Italy produces, however, in increasing quantities, the basic components of modern paints and varnishes. White pigments are produced in Milan, Spinetta Marengo and Livorno; organic pigments (red, amaranthine violet etc.) in the ACNA establishments of Cesano Maderno, at Melegnano and Cengio and inorganic pigments (greens, yellows, orange and blue) at Spinetta Marengo.

Binding elements which keep coloration uniform and resist atmospheric agents are synthetic resins or nitrocellulose which are mostly of Montecatini production.

SOVIET, POLISH and CZECH ABSTRACTS

Solvent Effect on Drying of Polyester Lacquers

V. Zvonar and S. Pokorny. Chemicky Prumysl, Vol. 34 December 1959.

The authors studied the inhibiting and retarding action of various organic solvents (hydrocarbons, alcohols, ketones and esters) upon the curing of unsaturated polyester resins and polyester lacquers, and on the properties of the formed films, in an attempt to lay basis for suitable formulations of polyester lacquers. They derived a simple functional relationship between the times of jelly-forming and -curing on the one hand, and solvent concentration on the other. Alcohols (methanol, ethanol and n-butanol) were found to have the greatest inhibitory and retarding effect; hydrocarbon solvents (benzene, toluene, xylene) showed practically no effect on the reaction rate. The effect of ketones (acetone, methylethylketone, methyl cyclohexanone) and esters (ethyl-ecetate, n-butylacetate, dibutylphthalate) was small. The inhibitory effect depends mainly on the functional group type, and on concentration; the smaller the molecular weight of solvent, (i.e., the greater the concentration of functional group), the greater its inhibitory effect. Inhibition is transient, and plays a role only block copolymerization. After solvent evaporation, the film dries normally (except with low-volatile solvents). The described relationships may be utilized in bringing about a temporary inhibitory effect to increase pot-life of the lacquer: the addition of a small amount of low-molecular hydrocarbon (methanol, conc. = 15%) extended the life fivefold to about three hours. Methylethylketone, which does not change lacquer stability, positively affects lacquer spreading and film formation; it is the only solvent not lowering surface hardness of lacquer films. In combination with methanol, methylethylketone (in conc. up to 10%) is a suitable component of lopyester lacquers. (In Czech).

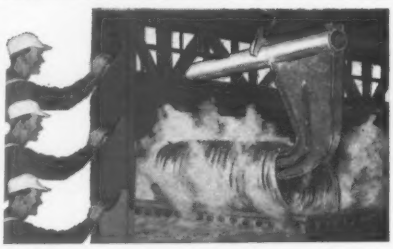
Methods of Increasing Stability of "Nitro-Enamels" Films.

B. Ya. Gorovoi. Khimicheskaya Promyshlennost', 5:391-393 (September 1959).

The author examines the problem of increasing the resistance to aging of nitro-enamels in paint-varnish materials, widely used in the USSR for coating machinery, instruments, furniture etc. Nitrocellulose films are subject to aging due to physical processes (the evaporation of plasticizer and solvents decreases the film elasticity), structural rearrangements owing to relaxation processes, and chemical processes. The latter are dealt with in detail. Previous work has shown that the denitration of nitrocellulose affects not only the nitrocellulose molecule but also the plasticizer; use of castor oil as plasticizer, and introduction of pigments into enamels with castor oil lead to an increase in the rate of aging of the films. The exclusion of plasticizer from the solvate coat around pigment particles, as in the production of dry pastes, leads to much higher resistance to aging; the author suggests to pulverize pigment in surface-active substances: experiments with pulverizing ZnO with a solution of a cationic surfactant in a solution of ethyl alcohol increases the mechanical properties of the coating. The addition of cationic surface-active agent also retards the hydrolysis of the nitrocellulose molecule, adding to its stabilization, and increasing the resistance to aging; furthermore, it tempers the relaxation processes. The author cites only work carried out in the USSR.

Organotin Polymers.

D. A. Kochkin, V. N. Kotrelev, M. F. Shostakovskii, S. P. Kalinina, G. I.



M

"Defense-in-Depth"

Now! A four-coat *M50*® chemical atmospheres

SYSTEM BENEFITS This is an effective paint system for resisting the corrosive attack of severe chemical atmospheres . . . corrosive fumes, heat, dampness . . . upon steel. The protective paint film is a four-coat system (minimum thickness, 5 mils) containing compounds known for their high basic resistance to most chemicals and to moisture.

In addition, a large volume of *M50*® *basic lead silico chromate pigment* is distributed in each coat and, consequently, throughout the entire paint system. It has been demonstrated by extensive exposure testing and in the field that *M50* pigment provides rust inhibition of a superior order. And as a pigment, it is unique in that it combines anti-corrosion and weather resistance and can be incorporated into every coat of a paint system. In finish coats it doesn't fade and doesn't overwhelm the tinting color.

What's more, *M50* pigment has exceptionally low water solubility . . . a distinct advantage in severe chemical environments.

***M50* PRIMER, Two Coats (*M50* Paint No. 120)** This paint is a National Lead suggested formulation for use wherever the need is for a primer with outstanding resistance to acids, alkalis, solvents. Base and Activator are packaged separately. They are mixed prior to application in the proportion 2.9 volumes of Base to 1 volume of Activator in quantities no greater than will be used in a 24-hour period.

***M50* FINISH, Two Coats (*M50* Paint No. 65)** This is a National Lead suggested fast drying chlorinated rubber paint for outdoor use

***M50* PRIMER, Two Coats (*M50* Paint No. 120)**

For priming on clean (preferably sand-blasted) steel surface where a high order of chemical resistance is required.

	Pounds	Gallons
Pigment		
M50® (basic lead silico chromate pigment)	852.0	24.99
BENTONE® 27 (gelling agent)	4.5	0.29
	856.5	25.28
Vehicle		
Epoxy resin*	313.0	31.30
Urea resin solution*	16.0	1.88
Methyl isobutyl ketone	100.0	14.97
Xylol	100.0	13.79
Ethylene glycol monoethyl ether	100.0	12.99
Soya lecithin	5.0	0.58
Methyl alcohol – water (95-5%)	1.3	0.20
	635.3	75.71
TOTALS: BASE	1491.8	100.99
Activator (Mix 1 vol. with 2.9 vols. of base)**		
Amine type activator (C-111)	137.0	16.89
Methyl isobutyl ketone	43.0	6.44
Xylol	43.0	5.93
Ethylene glycol monoethyl ether	43.0	5.58
TOTALS: ACTIVATOR	266.0	34.84

*Suggested resins are found in the full data sheet, offered above
**Mix no more than will be used in 24 hours

Kuznetsova, and V. V. Borisenko. Vysokomolekulyarnye soedineniya, vol. 1, 3:482-484 (1959).

Aiming at preparation of organotin polymers with properties suitable for their use as insecticides, stabilizers, additives to synthetic oils, anti-aging agents of various resinous materials, etc., the authors studied the polymer of triethylstannylmethacrylate and its copolymers with methylmethacrylate, methacrylic acid, styrene, acrylonitrile, cyclopentadiene, and divinylbenzene, prepared by polymerization in presence of benzoyl peroxide. The possibility to obtain polymers on the basis of trialkylstannlmethacrylates and dialkylstannylmethacrylates was established. The majority of products are solid, brittle polymers; tripropyl- and tributylstannylmethacrylate yield elastic polymers and copolymers. Some of the polymers and copolymers absorb X-rays.

The Effect of Organopolysiloxane Coatings on Adhesion of Ice to Various Surfaces

K. A. Andrianov, B. V. Deryagin, N. N. Zachavaeva, M. V. Sobolevskii and M. V. Talaev. Zhurnal Prikladnoi Khimii, Vol. 32, Dec. 1959.

A description of the apparatus and method devised by authors to measure adhesion of ice to various surfaces coated with fifteen different types of organopolysiloxane films. The results indicate the effectiveness of these coatings in lowering ice adhesion to such surfaces. The following organopolysiloxane liquids were found most effective: methylpolysiloxane (viscosity = 271, d_4^{20} = 0.978; and viscosity = 347.48, d_4^{20} = 0.982), ethylpolysiloxane (visc. = 1161.61, d_4^{20} = 1.037), isoamylpolylpolysiloxane (visc. = 3724.06, d_4^{20} = 0.956). The last-named showed best properties: it decreased shering force 10 times at small film thickness (0.1 mm). All three liquids were found very stable at the surfaces tested, and did not "wear off" after many repeated freezing. Carefully wiped off the surface, these liquids leave a film capable of lowering ice adhesion six times. Good results were obtained on aluminum surfaces coated with lacquer, on resinous surfaces, and on glass. Results obtained with lacquer-free aluminum surfaces and window glass were less good. The authors recommend application of organopoly-siloxane liquids for surfaces exposed to icing. (In Russian).

Polymerization of Cyclopentadiene

I. L. Iukhnovskii and A. V. Charnobai. Izvestiya vyssh. ucheb. zaved., khim. i khim. tekhnol., Vol. 2, 1959.

Description of studies carried out at the Kharkov Polytechnics and dealing with polymerization of cyclopentadiene, with the aim of preparing a film-forming polymer. Complexes of BrF_3 with alcohols and esters (in conc. = 0.5%) were shown to be best catalysts; BrF_3 alone leads to the formation of a three-dimensional polymer. Polymerization proceeds faster in chlorinated than aromatic solvents. Viscosity increase was observed upon storage. Ammonia and diphenylamine proved to be best as stabilizers. The spent BrF_3 may be regenerated by ammonia.

Uses of Surface-Active Substances In the Paint-Varnish Industry.

A. M. Shtern. Khimicheskaya Nayka i Promyshlennost', Vol. 4, 1959.

A review article of the applications of surfactants in the paint and varnish industry, relying upon a bibliography of predominantly Western sources. Soviet contributions are cited in the area of theoretical work by Rehbinder. Recent Russian work on flocculation rate of Milori blue particles has shown polyacrylamide as being most effective: it accelerates (in amounts of 0.25-0.3% of dry pigment weight) pigment sedimentation tenfold, thus permitting washing by decantation to be 8-10 times faster, without any change of technical properties. (In Russian).

On the Methodology of Estimating Pigment-Oil Consumption

B. Svoboda and J. Korinsky. Chemicky Prumysl, Vol. 34, (December 1959.

The authors suggest a revision of the Czechoslovak Standard CSN 67-6531 for estimation of pigment oil consumption; the methodology of this standard is said to lead to incorrect and non-reproducible results.

50® Paint Systems Data Sheet **BB**

Metal Protective Paint Systems

paint system for severe

5 mils minimum of rust inhibition!

or exposed to acid or alkali fumes. In addition to high chemical resistance, it has outstanding resistance to moisture. It doesn't blister, and intercoat adhesion is excellent. High dry-film flexibility minimizes chipping. May be tinted.
APPLICATION — To insure good inter-coat adhesion, the following procedure should be followed; Second primer coat should be applied within 24 to 48 hours of first coat. First coat of finish paint should be applied over primer within 24 hours. Last coat of finish paint also should be applied over preceding coat within 24 hours.

System Data Sheets Available

Would you like the full series of *M50* "Defense-in-Depth" systems data sheets? If so, just write.

M50 FINISH, Two Coats (M50 Paint No. 65)

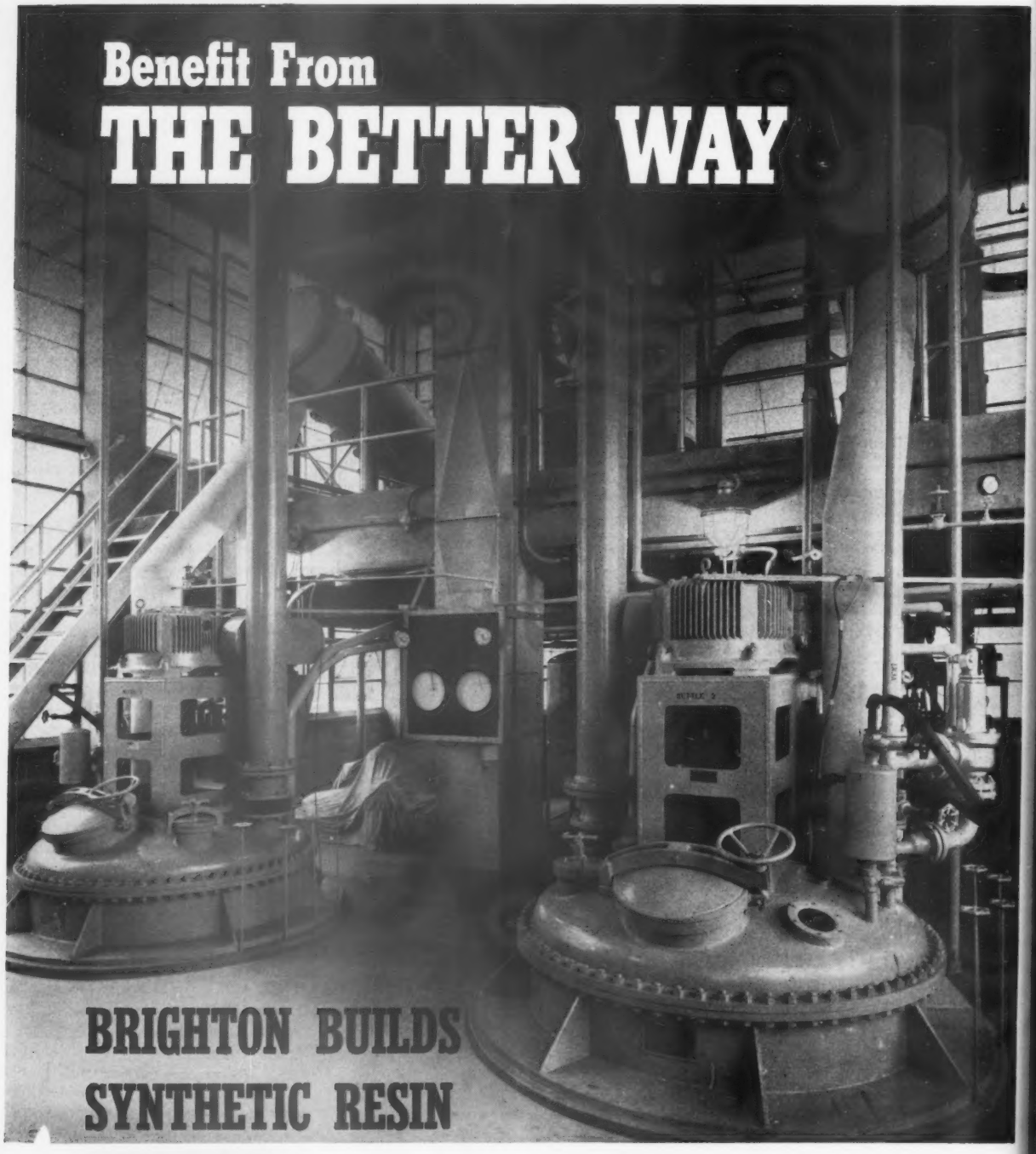
For finish coats applied over **M50** Paint No. 120. Provides outstanding service in severe chemical atmospheres.

	Pounds	Gallons
Pigment		
M50® (basic lead silico chromate pigment)	570.0	16.70
DYPHOS® (dibasic lead phosphite stabilizer)	6.0	0.10
BENTONE® 34 (gelling agent)	10.0	.70
	586.0	17.50
Vehicle		
Linseed oil, boiled	180.0	23.10
Chlorinated rubber, 20 cps	115.0	8.50
Naphtha, high-flash	180.0	24.80
Turpentine	180.0	25.00
Lead naphthenate (24%)	2.0	.20
Manganese naphthenate (6%)	0.8	.10
Cobalt naphthenate (6%)	.2	.03
Epichlorohydrin	1.0	.10
Methyl alcohol — water (95-5%)	3.0	.45
	662.0	82.28
TOTALS	1248.0	99.78

PVC 35.6% · Weight per gallon 12.5 lbs.

NOTE: Prewet BENTONE gellants with the methyl alcohol — water.
These formulations are based on our research and the research of others, and they are believed to be accurate. No guarantee after formulation is made.

M50® an **oncor**® TRADEMARK *Pigment...A Development of*
National Lead Company
General Offices: 111 Broadway, New York 6, N. Y.



REACTORS

■ ■ ■ Brighton Reactors speed efficiency, lower processing costs in alkyd type resins. Nearly a half century is reflected in development of Brighton Reactors, so designed to handle a variety of alkyds, yet flexible enough to meet the demands of modern processing. Other basic components available include the condenser, decanter-receiver, thinning tank, heating plant, control board.

For "The Better Way" consult Brighton Engineers for complete details on our synthetic resin reactors.

BRIGHTON

METALSMITHS EST. 1914

BRIGHTON **CORPORATION**

820 STATE AVENUE · CINCINNATI 4, OHIO

P

PRODUCTION

PACKAGING

MATERIAL HANDLING

NEW EQUIPMENT and MATERIALS

A close-up of the powerful permanent magnetic rods of the Eriez Ferrous Trap shows the fine iron contamination removed from printing inks at the Sinclair and Valentine plant in Secaucus, N. J. For details on this mobile filtration unit, see page 75

Continental announces a

NEW

unlined Tripletite can with built-in protection for PVA paints.

Ask your Continental salesman about this!

Continental new **Tripletite** can for **PVA** paints now gives more **product protection** than any other can.

CONTINENTAL CAN COMPANY

Eastern Division: 100 E. 42nd Street, New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4
Canadian Division: 790 Bay St., Toronto, Ont.
Cuban Office: Apartado #1709, Havana

BREAK-EVEN POINT—A CONTROL TECHNIQUE

By
Lawrence Shatkin

The break-even chart can aid in decision making by serving as a warning device.

THE break-even chart is one aspect of budgetary control. The break-even chart can be shown graphically or by a simple arithmetic analysis illustrating the relationship between stand-by (fixed) and variable costs, output, and revenue. It is the point where sales income balances expenses, and no profits and losses occur. It can aid in decision making by serving as a warning device because the immediate state of affairs are known, and a future course of action can be projected.

Before considering the use of a break-even chart, accurate records of one's operations should be available. This control technique can be used at all levels of activity, and the classification of stand-by and variable costs should be established from past practices.

The use of a break-even point analysis connotates a managerial aspect of accounting, reflecting a dynamic situation. It moves away from accounting terminology which are static in nature. This control device can be used for budgeting, forecasting, and controlling costs.

Preparation of the Chart

The figures needed to construct a break-even chart are usually stand-by and variable costs, a forecast of maximum sales, and the customary sales pattern that has prevailed. The vertical or Y-axis measures the costs incurred with the resulting profits and losses. The horizontal or X-axsis measures the volume in some unit as per cent potential volume, physical units, or sales volume in dollars.

Fixed expenses include such items as rent, insurance, taxes, depreciation, and other items which do not vary with the volume of sales. Semi-variable expenses are those items such as advertising which change to some extent according to volume, but which may be controlled as a matter of management policy. Variable expenses such as labor and materials, or other features of cost of goods sold, and salesmen's commissions vary in direct relation to the rate of sales.

In Table 1 is a summary of a hypothetical case under varying conditions, which will also be shown graphically.

The Break-Even Chart

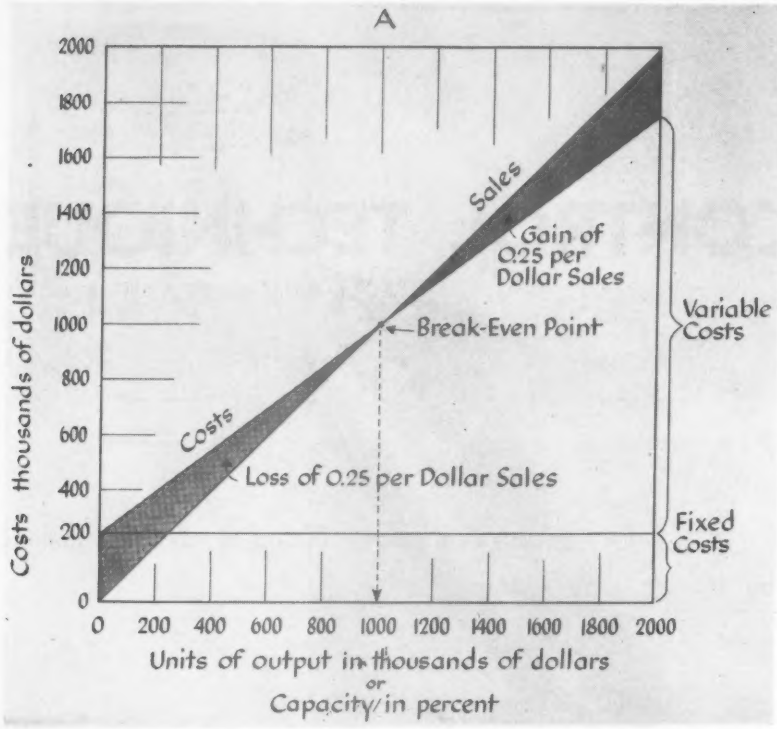
Management activities consist of planning, organizing, assembling resources, directing, and checking results. The Break-Even graph can aid in these functions. It indicates what changes have to be made to bring expenses into line with income. Changes in costs and sales can have a great effect on profits. Impending trouble in a sales program can be anticipated. Different pricing policies will affect profit, which can be diagrammed. The reduction or increase in profits

Table 1. Hypothetical Case Under Varying Conditions

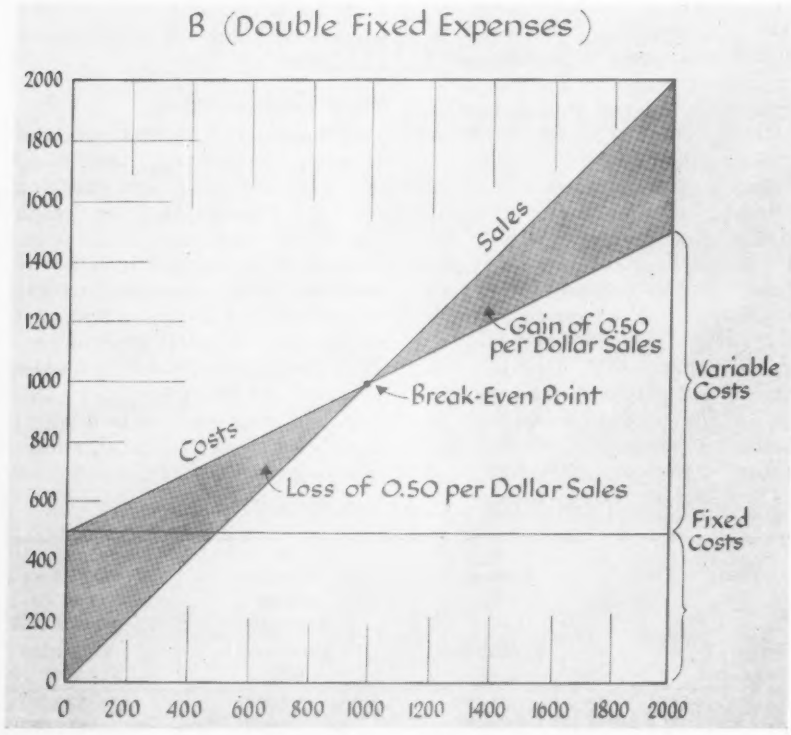
Item	A Normal	B Double Fixed Expenses	C One-half Fixes Expenses of A
Output or Capacity	$1,000,000 80%	$1,000,000 80%	$1,000,000 80%
Fixed Costs	250,000	500,000	125,000
Variable Costs	750,000	500,000	875,000
Total	$1,000,000	$1,000,000	$1,000,000
Variable Rate	$0.75	$0.50	$0.875
Available MI*	0.25	0.50	0.125
Total	$1.00	$1.00	$1.00

*MI = marginal income, which equals fixed costs plus profit

The opinions expressed in this feature are not necessarily those of any particular firm or organization.



The above chart is of the square type, and the intersection of the total cost line and sales determines the break-even point.



and the ensuing changes in costs and volume can be predicted.

The use of this chart shows the decrease in sales volume that can occur before profits disappear. Also, in a contemplated expansion program the effect of capital expenditures on the financial structure of the company can be depicted. A declivitous change in the cost structure may be too great an undertaking. In any event, this chart affords a visual means of evaluating any expansion program.

Any increase in wages will naturally move the break-even point upward, unless it is neutralized by an increase in productivity or efficiency. The chart clearly shows that profits can only take place after the break-even point is exceeded, and the danger of being priced out of the market makes it essential that economies and efficiencies be injected continuously in order to help protect and expand the profit position of the company.

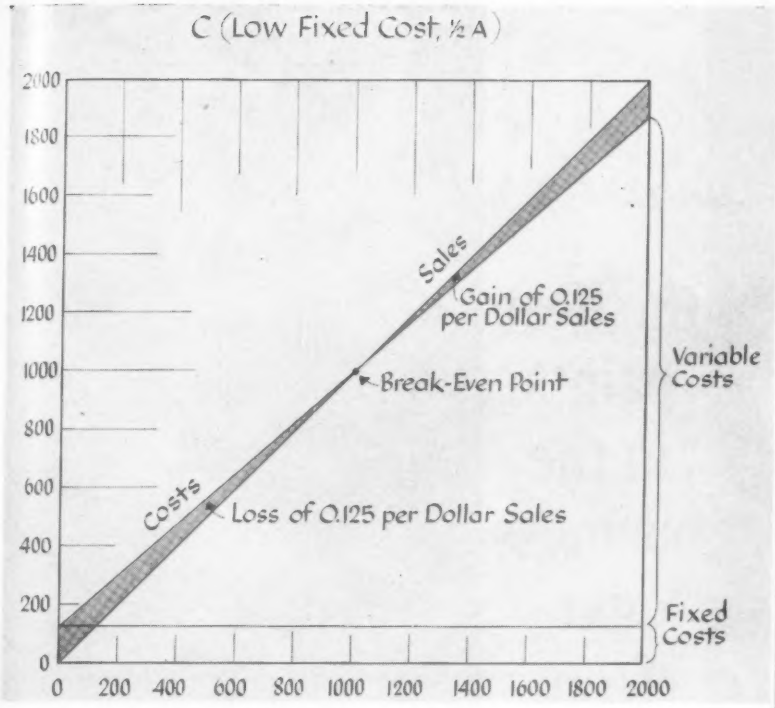
The break-even chart can be used to report the performance of departments or products. It will enable critical examination of the product mix, and unprofitable lines may have to be dropped. This analysis can be planned for territories in order to determine those worthwhile retaining.

Limitations

The break-even chart does not indicate the most profitable level. The chart is useful as a diagnostic tool, and in providing flexible standards of expense in relatively simple operating situations. They are usually more adaptable to a company making a single product, or one that contains an operation in which the volume of activity can be readily defined. An assumption is made that costs will vary with volume at a constant rate, but this may, at times, be an over-simplification. The price rises in many raw materials, current wage increases, escalator clauses in existing contracts, changes in selling prices, tend to make the situation more complex. However, when used in conjunction with other techniques it can help to make decisions easier.

Flexible Budgets

They are simply a means of interpolating between two alternative budgets. They are concerned with the expenses incurred at different levels of activity. Income and expenses are budgeted for a low level and for a high level; then expenses are estimated for any level of activity between the two budgeted figures. This can be done mathematically or graphically. The break-even chart indicates what expenses should be in relation to



income, and shows the differentiation of profits arising from volume and that resulting from improved operations.

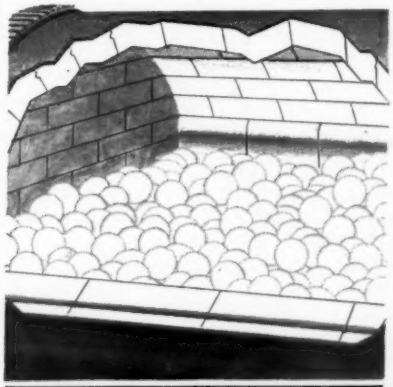
Budgetary Controls in Use

Budgetary control is a tool of administration. It enables us to set targets in five main areas: the profit picture being the responsibility of the president, sales under the domain of the sales manager, production and financial goals under the supervision of a production manager and controller respectively. Research and development projects would be the responsibility of the technical director.

A good budgeting system can have a psychological up-lift on an organization, by promoting thinking and relationships among executives. It gives one the ability to forecast the effect of product mix on profits and cash flow. Budgetary control contributes to planning by forcing many executives to project their thoughts to the future.

YOU GET BETTER HIDING
with these
SOUTHERN CLAYS
Al-Sil-Ate W
Al-Sil-Ate O
Distributors In Principal Cities
Southern Clays, Inc.
33 Rector St., New York 6, N.Y. • Phone Digby 4-4020
Write for samples and technical information.

LET FASTER GRINDING LONGER LIFE
make money for you in the mill room!

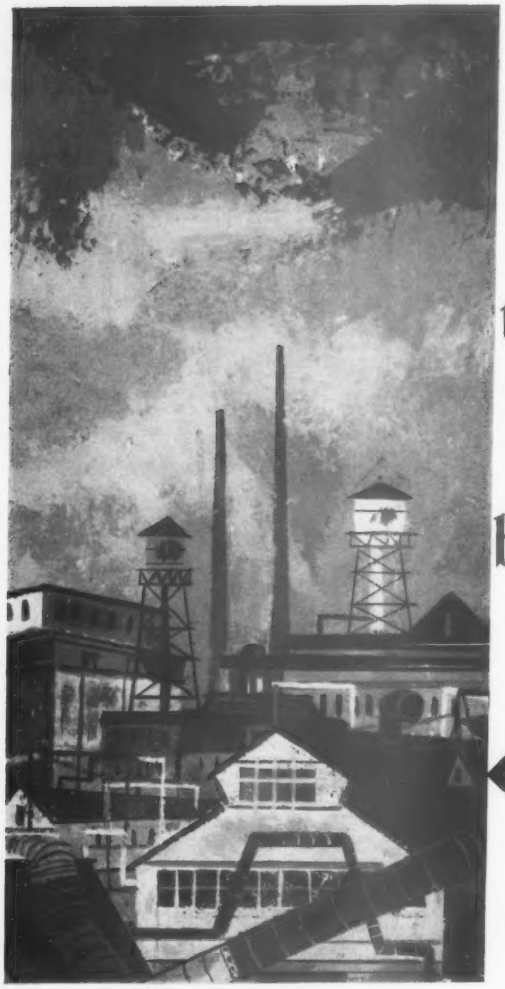


ARLCITE® BALLS and BLOCKS

High-density ARLCITE grinding media goes hand-in-hand with today's modern mill practices to *speed production* and *lower operating costs.*

Only ARLCITE has the optimum balance between high density and bonding qualities to give you up to 50% faster grinding while extending service life over 300%. Tongue and groove construction insures a tightly keyed lining which remains firmly in place.

PORCELAIN DIVISION
FERRO CORPORATION
East Liverpool, Ohio



the best paints in the business get from here to here in

Paint manufacturers who want to maintain quality control clear through to end use, ship their paints and coating vehicles in Vulcan Steel Containers. Vulcontainers protect quality, and save money, too. They're available for immediate shipment, in any quantity. Sizes run from 1 through 55 gallons, and Vulcan has an exceptionally wide selection of styles, closures, colors and Hi Bake linings. Write today, to learn how you can give your paints a better send-off and save money, too!

Attach this ad to your calling card and mail today for ☐ free literature, or ☐ a meeting with your local 'Vulcansultant' a technical man who can help you with your container problems. • *In California:* Vulcan Containers Pacific Inc., *San Leandro* • *In Canada:* Vulcan Containers Limited, *Toronto, Vancouver, B.C.*

VULCAN CONTAINERS INC., *Bellwood, Illinois, Phone: LInden 4-5000* PVP-60

New Developments

Pabco Color Blender

Pabco Develops Color Blender System

A color blender system that lets a dealer mix 1320 different colors by tinting white bases has been developed by the Pabco Paint Div. of Fibreboard Paper Products Corp.

Based on machines that use 12 standard colorants, the blender system provides for tinting to 1320 colors in five interior bases—including for the first time Cin-dek-enamel—and more than 600 colors in three exterior bases.

The full system includes a choice of two machines, a color chip rack display, the firm's color library and an album containing 1080 colors and their mixing directions.

While certain popular colors would normally be carried ready-mixed, the new system allows a sharp reduction in inventory. For instance, a store might normally carry in stock 48 gallons of a particular base, in a range of 12 colors. This would usually mean that the dealer would have on hand only four gallons of any one color. With the new color blender system, he might carry 32 gallons in the color and base his customer wanted.

Quart Cup Paint Heater Brings Low Cost Painting

Made especially for medium and small paint spraying requirements, the new Beck Quart Cup Heater is also ideal for laboratory projects, small batch painting and touching up. It brings the recognized advantages of hot spray painting to all users, including even the smallest shops and limited users, because of its extremely low cost.

The new heater is designed for simple, trouble-free and safe application of the hot spray technique for highest quality finishing. The Beck Quart Cup Heater incorporates engineering features which assure positive and continuous thermostatic control for "just right" temperature and viscosity. This heater is compact, easy-to-use, light-weight (only 10 ounces more than a conventional cup) and is made of non-corrosive, welded aluminum.

With the Beck Quart Cup Heater, paint is sprayed hot at higher viscosity, resulting in greater concentration of solid pigment and increased paint coat thickness. Fewer coats are necessary and frequently one coat is all that is required. Solvent waste is lessened, coverage per gallon is increased and quality of finish is improved in spraying either lacquers or enamels.

Mobile Unit's Magnetic Traps Purge Iron from Printing Inks

At the Secaucus, N. J. plant of Sinclair and Valentine, manufacturers of rotogravure inks, a notably efficient mobile filtration unit has been developed to remove contaminants from inks as they are discharged from the several ball mills. Of particular importance in this unit are two Eriez non-electric magnetic ferrous traps arranged in tandem in a flexible line where they effectively remove all fine iron which might otherwise damage the printing image and cause excessive wear on the printing cylinders. Presence of this ferrous contamination in the ink results from attrition of steel balls in the ball mills employed to disperse the pigments in their vehicle by a vigorous tumbling action.

In addition to protecting product purity and the customers' interests, the Eriez magnetic traps have also been found valuable in preventing iron damage to the unit's pump, and the "blinding" of the extremely fine mechanical filters used to control particle sizes and to screen out unwanted non-ferrous contaminants.

Eriez ferrous traps are composed, essentially, of an arrangement of powerful permanent magnetic rods suspended in a casing through which is moved the material to be purged. The liquid, forced to pass between and around the rods, is thoroughly exposed to the overlapping magnetic fields, so that even the finest particles of iron are instantly captured and securely held. Periodically the trap cover, to which the rods are fixed, is removed and accumulations of iron wiped clear. Since the traps require no external power source, they are readily and quickly installed as mobile or stationary units with either new or existing machines. Complete information may be obtained from Eriez Manufacturing Co., Erie 6, Pa.

Overall view of the mobile filtration unit in operation at Secaucus, N. J. plant of Sinclair and Valentine.

Zinc-Stearated Sandpaper Does Not Affect Bonding Of Lacquers to Sealers

Bonding of lacquers to sealers is not adversely affected when sealed wood surfaces are finished with zinc-sterated sandpaper. This is the conclusion reached from an industry-wide survey recently completed by Richard P. Villwock, research engineer for Michigan Abrasive Co., 11900 E. Eight Mile Rd., Detroit 5, Mich.

Used principally for finish-sanding, zinc-stearated sandpapers were developed by the coated-abrasives industry to provide the woodworking trades in general with an additional working tool for meeting specialized conditions arising in product manufacture. On certain types of applications, standard grade cabinet papers have a tendency to load prematurely from a build-up of fine, soft wood particles or lacquer sealers between the abrasive grains. Where rapid loading is a factor, this build-up substantially reduces the paper's ability to "bite" into the surface. Because no appreciable abrasive grain wear or fracture is experienced when soft materials such as wood and paints are sanded, useful sandpaper working life can be greatly extended by preventing premature build-up.

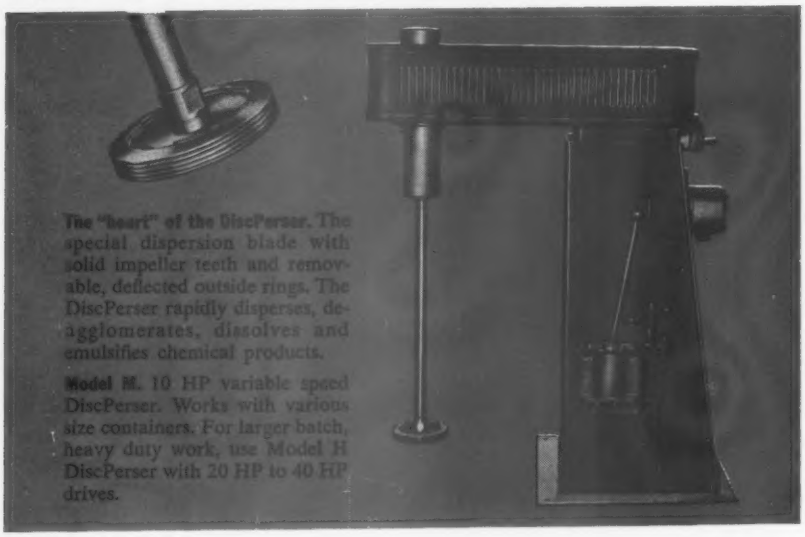
Treated sandpapers act as a deterrent to build-up by preventing the fine wood particles, wood resins or sealer coats from binding together into a solid mass. The stearate reduces adhesion between these particles, resulting in the formation of minute "spheres" that are periodically torn loose from between the grains when sanding. This leaves the grain edges exposed to continue their cutting action.

Field investigation reveals that problems experienced by using zinc-stearated sand-papers generally arise from inadequate sanded-surface preparation techniques. Stearated sandpapers generate an extremely fine dust that must be thoroughly removed from the surface before applying final finishing coats. Failure to remove this dust results in a disfigured finish and prevents the formation of a good bond.

To minimize these costly problems, which necessitate re-working and production delays, Mr. Villwock recommends cleaning the sanded surface with a clean tack rag or soft rag soaked with volatile solvents generally used for this purpose. Mr. Villwock also urges that manufacturers contemplating the use of stearated sandpapers pretest both the finishes and papers before incorporating them into their processes.

A laboratory testing procedure, suggested by Mr. Villwock, that results in producing the desired information consists of using at least two panels of the material being finished. One of these panels is given one or more coats of the sealer to be used and then sanded smooth with the sterated paper. One-half of this panel is wiped with a tack rage, while the other half remains unwiped. The whole panel is then given the final lacquer coat, and, after drying, both sides of the panel are studied.

The second panel is used for testing finish lacquer only. One or more coats of the finish lacquer to be used are applied to the whole panel. One-half of this panel is sanded with a stearated sheet, while the other half is sanded with a non-stearated sheet. The panel is carefully wiped with a tack rag, and the final finish coat is applied. After the surface is completely dry, the films are studied for differences in adhesion and appearance.



The "heart" of the DiscPerser. The special dispersion blade with solid impeller teeth and removable, deflected outside rings. The DiscPerser rapidly disperses, deagglomerates, dissolves and emulsifies chemical products.

Model M. 10 HP variable speed DiscPerser. Works with various size containers. For larger batch, heavy duty work, use Model H DiscPerser with 20 HP to 40 HP drives.

NOW! A finished dispersion in a single operation!

The new HOCKMEYER DiscPerser . . . produces very rapid ultimate dispersion...handles high-viscosity materials!

The DiscPerser's special blade operates at peripheral speeds in excess of 6000 FPM. The solid impeller teeth shred and break up pigment agglomerates. Material is discharged through the slots between the rings, at great speed and under intense hydraulic pressure. Tremendous fluid hammer action is developed by the smashing of material against the surfaces of these deflected outside rings. Material leaves the blade in thin, high-speed jet streams. Impact on the slower moving surrounding material creates further attrition and speeds the breakdown to original pigment particle size.

Versatile, the HOCKMEYER DiscPerser also: ● Cold cuts and dissolves exceptionally fast. ● Tints and lets-down unusually efficiently. ● Pre-mixes heavy bases for mill equipment; greatly increases the milling operation.

TRY IT AT OUR EXPENSE. The HOCKMEYER DiscPerser can increase your production, improve your product, save you money. Try it *free* in your own plant. Write for details and free descriptive folder. *Act now!*

Herman Hockmeyer and Co.
341 Coster St., New York 59, N. Y.

For details of how you can try the HOCKMEYER DiscPerser *free* in your plant and for a free, illustrated DiscPerser folder, clip this coupon . . . mail it today! PVP-6C

*My Name*_____

*Company*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

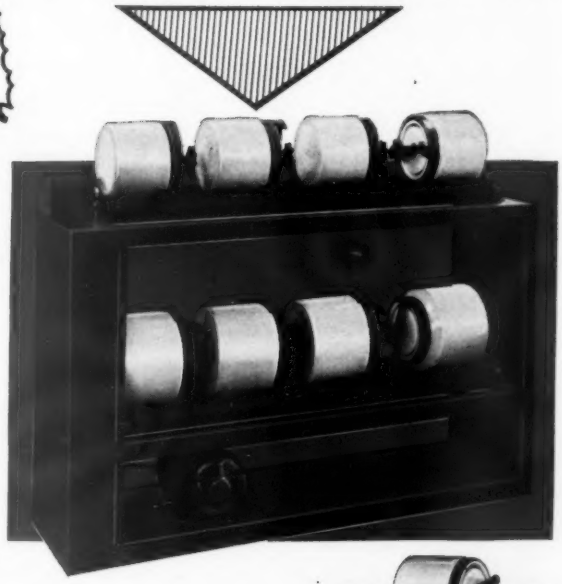
HERMAN HOCKMEYER & CO.
341 Coster St., New York 59, N. Y.

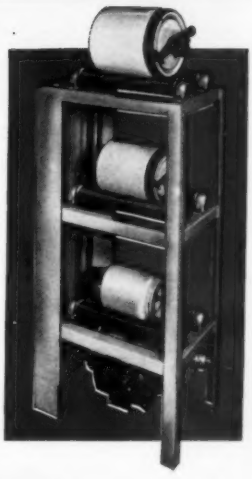
Look what has happened to JAR MILLS!

Laboratory Jar Mills have been vastly improved over the past few years. And U. S. Stoneware has led the way with a host of advanced design features that add up to speedier, more convenient, lower cost milling.

If your equipment is in the category of the obsolete unit above, it will pay you to investigate the broad "U.S." line. Modern "U.S." Jar Mills are rugged, efficient, easier to operate. They're designed to provide maximum capacity and flexibility in minimum floor space. Standard "Unitized" models require little floor space, have patented "no-creep" rolls that automatically keep jars centered. "U.S." Long-Roll units offer even greater space savings—permit you to expand milling facilities in the same floor area occupied by other models.

Check the wide range of types and sizes available to modernize your milling operations now. Write for Bulletin JM-290.

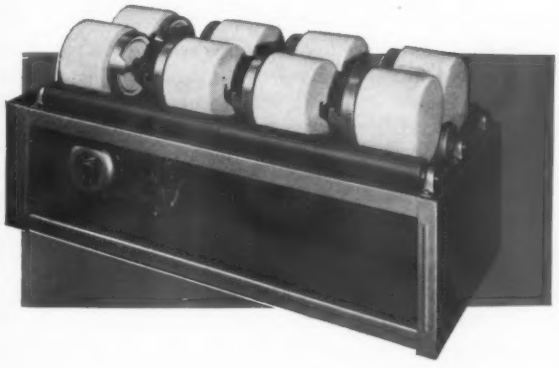




Above: Fig. 802D 2-Tier Long-Roll Jar Mill with 2 parallel rolls; handles jars 2" to 15" in diameter.

Right: Fig. 784 3-Tier "Unitized" Jar Mill has exclusive "self-centering" rollers; handles jars 2½" to 13" in diameter.

Left: Fig. 901DV 1-Tier Long-Roll Jar Mill has 3 parallel rolls; variable speed drive; rolls jars 2" to 15" in diameter.



PROCESS EQUIPMENT DIVISION

U. S. STONEWARE

AKRON 9, OHIO

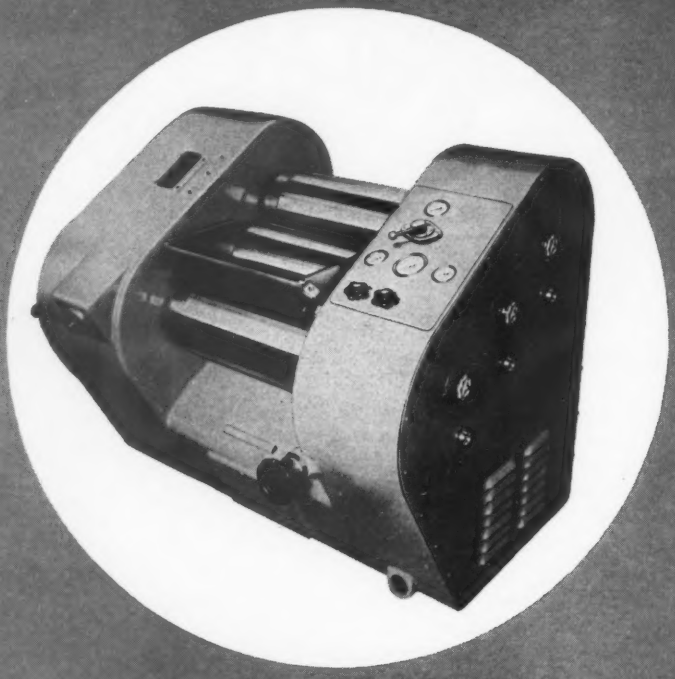
448F-3

HANDY HINTS ON JAR MILLING

You can keep grinding jars separated and positioned exactly where you want them on any long-roll mill with patented "U.S." Jar Positioners. Made of long-wearing hard rubber, simple to install, can be quickly moved to any position.

New fully hydraulic

BUHLER 3-Roll Mill



SDA
Roll Dimensions: 10" x 20"

SDT
Roll Dimensions: 16" x 32"
16" x 40"

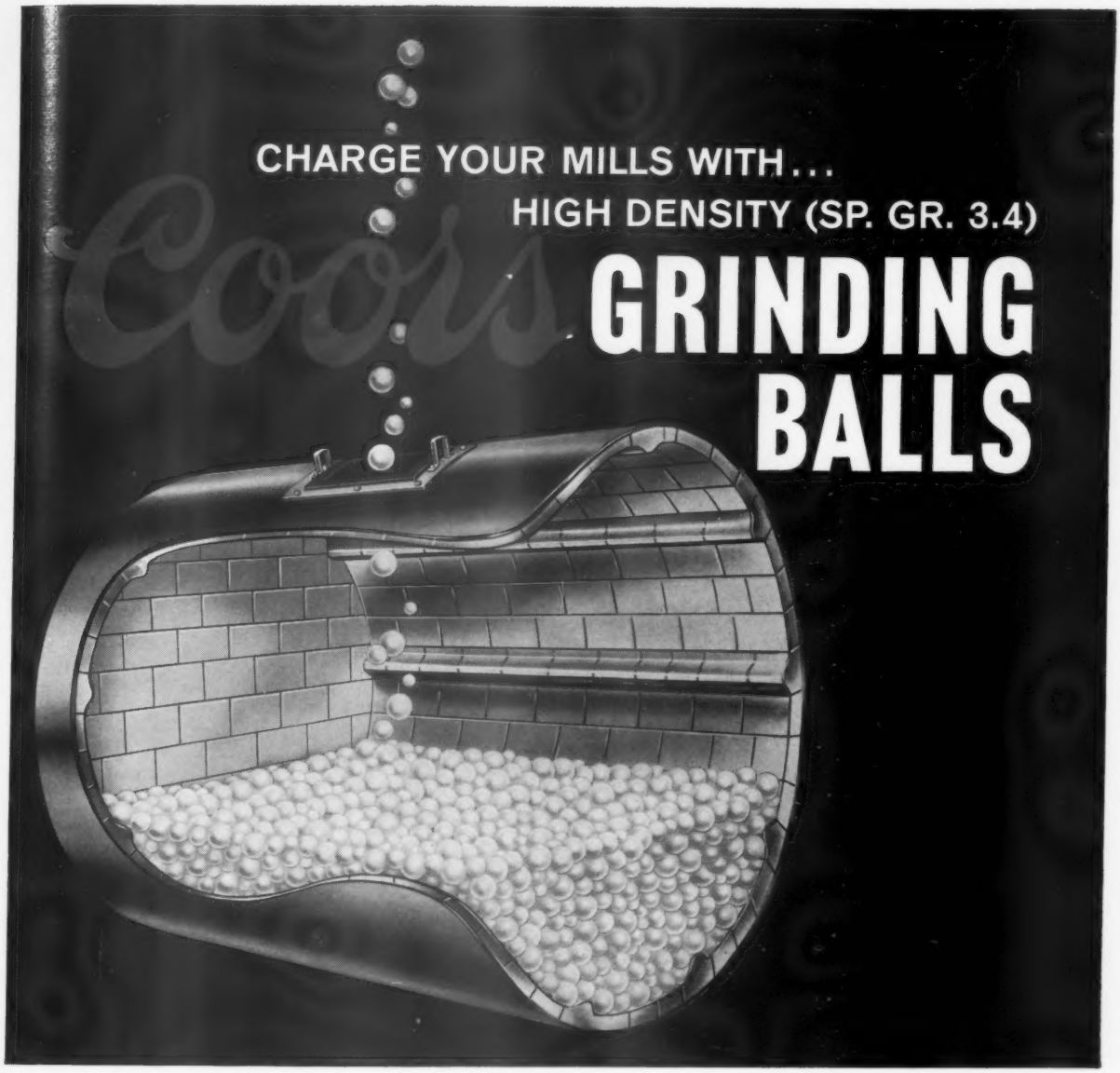
• Up to 60% higher output

• Absolutely even pressures for uniformly fine grinding

1. New hydraulic regulating system provides absolute pressure stability and easiest (1 second) setting of rolls.
2. Determines exact pressure for any formula and duplicates it for that formula at any time.
3. Rolls disengage for cleaning in *1 second.* A simple hand-lever shift disengages rolls and scraper blade instantly. By shifting hand-lever back to operating position, rolls and scraper blade are restored to the exact pressure they were set at before disengaging.
4. New feed hopper arrangement increases working surface. Hopper cheeks do not rest on the roll, but are hydraulically pressed to the shoulder of the roll; permit grinding across the whole length of the roll, with even wear.
5. Hydraulically operated scraper blade maintains selected pressure irrespective of wear. Never loses pressure — hydraulic control takes up automatically to maintain exact selected pressure with wear.
6. Can be furnished with variable speed drive for the first roll, or driven by a 2- or 3-speed motor. Regulating the speed of the first roll for paints and inks of different consistencies increases the capacity 60% and more.

BUHLER BROTHERS, INC. (U.S.A.)
130 COOLIDGE AVENUE, ENGLEWOOD, NEW JERSEY

BUHLER BROTHERS, (CANADA) **LTD.**
24 KING STREET WEST
TORONTO 1, ONTARIO



Save Time! Save Money!

REDUCE your grinding time 40 percent or more! Increased grinding efficiency results from the greater weight (Sp. Gr. 3.4) of Coors High Density Grinding Media.

INCREASE production of existing mills by taking advantage of the reduced grinding time—or you can increase the batch and get more volume from your mills on your present grinding schedule.

IMPROVE milling results—by operating your mills at lower temperatures, by eliminating excessive amounts of unground material, by making it easier to clean the media and by getting longer wear from the media and the mill lining.

We shall be glad to give you our recommendations on how to achieve these results if you will write to us on your company letterhead and describe your operating problem.

COORS PORCELAIN COMPANY

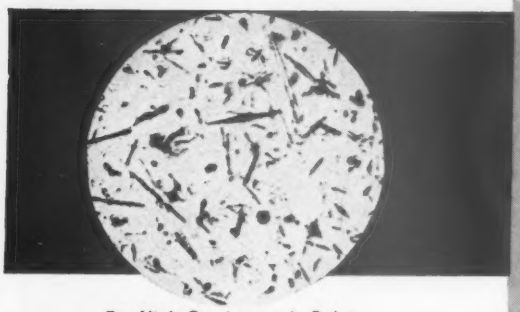
600 NINTH STREET—GOLDEN, COLORADO

Manufacturers of High Density Grinding Media and Mill Liner Brick.

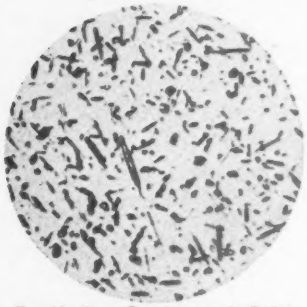
AZO

acicular ZINC OXIDE gives paint Extra durability

Forty years ago, American Zinc produced the original acicular lead-free zinc oxide that received wide acceptance by the paint industry and led the way over the years to improved durability from zinc oxide in exterior paints. AZO acicular zinc oxides are available over a wide range of oil absorptions to give you the required paint consistency.



For High Consistency in Paints
AZO ZZZ-22



For Medium Consistency in Paints
AZO ZZZ-11

For Low Consistency in Paints
AZO ZZZ-33

AZO acicular zinc oxides are free from detrimental colloidal fines, produce exceptional weathering properties in exterior paints, and are resistant to hard settling during shelf storage. For general use in the production of paints and enamels.

1ST

American Zinc was the first, *and is still the only* producer of acicular lead-free zinc oxides covering a wide range of oil absorptions from high to low *and including the intermediate ranges.*

ALL AZO PAINT GRADE ZINC OXIDES AVAILABLE AS AZODOX (De-Aerated)

AZODOX has twice the apparent density, half the dry bulk. Faster handling, easier storing, quicker mixing.

American Zinc sales company

Distributors for AMERICAN ZINC, LEAD & SMELTING COMPANY
COLUMBUS, OHIO • CHICAGO • ST. LOUIS • NEW YORK

NEW EQUIPMENT AND MATERIALS

This section is intended to keep our readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.

CROSSLEY

BALL MILLS
All-Steel Construction

New line of ball mills at the same price levels as its original line, which has been on the market for over 50 years has been announced.

The new ball mills feature all-steel construction and roller bearing pillow blocks for all sizes. Named the "Double-C" line, the mills can carry double the charge weight for which they are rated. The 6′ x 8′ model is rated for 4500-lb. charge, and will carry 9,000 lbs. of high density media. 15 psi air pressure can be applied for fast unloading.

With the trunnions rotating in roller bearing pillow blocks, the mills will always be in perfect alignment. This roller bearing construction also permits greater starting ease, will decrease power requirements, and wear.

The new line has 24 models ranging in sizes from 18″ x 24″ to 80″ x 77″.

The Crossley Machine Co., Dept. PVP, Trenton 9, N. J.

HAND CREAM
Protects against Chemicals

New development in skin protection called "Glovs," is said to protect the skin against the harmful effects of harsh chemicals in paint and lacquer.

Packaged in easily handled, unbreakable plastic jars, "Glovs" is more economical, safer and more effective than any other type of protective covering for the hands, the company says. Daily use of the cream can prevent drying and cracking of the skin. Product can be safely used over cuts, abrasions and sores.

National Lacquer and Paint Co., Inc., Dept. PVP, 7415-39 S. Green St., Chicago 21, Ill.

CONVEYORS AND DUMPERS

DRUM DUMPER
Easy Loading

New dumper line is designed to operate at lifting heights from 12″ up to 50′ emptying its contents into mixers, tanks, tumblers, chutes, conveyors, hoppers etc. Manual labor is kept to a minimum and, with the added factors of easy loading, speedy dumping, and reduced job accidents, it means appreciable savings. Rated capacities are from 100# to 5,000# dependent upon unit selected. The dumper handles powders, granuings, castings, and scrap.

Conveyors and Dumpers, Inc., Dept. PVP, Hillsdale, N. J.

DISPERSING AGENT
High Shearing Stresses

Daxad 40, a new dispersing agent which makes possible manufacture of gloss emulsion paints with a dissolver rather than pebble or roller mill, has been introduced.

Designed as a multi-purpose emulsion paint additive, the product is a solution of a polyelectrolyte dispersing agent in methanol and water. It functions as a pigment dispersant, stabilizing agent, and protective colloid.

As a protective colloid it prevents pigment agglomeration, giving gloss paints with good package stability. Its compatibility with vinyl acetate polymers makes it possible to attain superior gloss and hiding at any given pigment volume concentration.

Dewey and Almy Chemical Div., W. R. Grace & Co., Dept. PVP, Cambridge 40, Mass.

HOUSTON

PYCNOMETER
Two Cylinders

New air comparison pychometer employs only two cylinders and is both smaller and lighter than the first prototype.

A thorough search of issued patents and trade literature indicates that the comparison principle employed, which derives from the kinetic theory of gases, has never been used before.

The air comparison pycnometer will not only shorten accurate den-

sity determinations from hours to one minute, but should open up new areas of application for density measurements for quality control, moisture and porosity determination, etc.

Houston Instrument Corp., Dept. PVP, P.O. Box 22234, Houston 27, Tex.

WATER-SOLUBLE POLYMERS
Nonionic, Anionoic, Cationic

A new family of water-soluble polymers, useful as adhesives, thickeners, protective colloids, and suspending agents, is available.

Called "Ceron," the new chemical is available as a nonionic material, a product which is anionic in nature, and a product which is cationic. In addition, Ceron N, nonionic, is available in three different types.

Chemically, the new water-soluble polymers are polymeric carbohydrates etherified to give the water solubility, physical and mechanical properties, and other characteristics desired. Because of their special chemical compositions, and the manufacturing processes used, they offer certain advantages.

In solution properties, the Ceron polymers have certain characteristics similar to starches. However, they are soluble without cooking and do not retrograde. Solutions, even of the very low viscosity types, can be prepared without color degradation; and viscosities are stable with no increase on aging. In addition, other differences become apparent on study.

Ceron N types are nonionic and have wide utility as thickeners, sizings, and emulsion stabilizers. Their adhesive and film-forming properties make them equally useful for tape, label, and envelope adhesives. Ceron N-4S can be used as a water-soluble thermoplastic to produce films which not only have quick tack and a wide range of adhesion, but which can be heat-sealed as well.

Ceron N-4E, a very low viscosity, low-molecular-weight type is outstanding for its color and color stability, high solids solution, stable viscosity, and film quality. All Ceron N grades can be readily insolubilized with suitable reagents. This property can be of particular interest in strippable coatings, textile finishes and coatings, and binders.

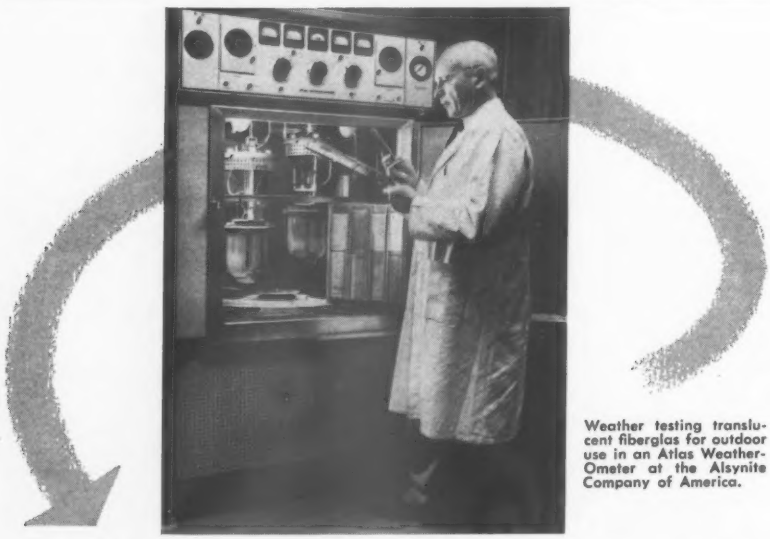
Ceron AN is anionic, providing a net negative charge when in solution. This grade has aroused special interest as a suspending agent and thickener in emulsion polymerization reactions. Ceron CN, on the other hand, contributes a net positive character to its solutions, since its substituent groups are polar in nature. It is utilized in certain emulsifications, and is useful in cotton textile processing and in paper making, since it has an affinity for the anionic cellulose fibers.

Hercules Powder Co., Dept. PVP, Wilmington 99, Del.

ORGANIC YELLOW
Lead-Free

New Hansa-type organic yellow is offered as a marked improvement over the standard Hansa G pigment. Properties most noticeable are better fade resistance and reduced solvent sensitivity. Color values are slightly better in terms of cleanliness and tint shade. This color is, of course, lead-free and will aid the quality and processing of non-toxic decorative enamels.

Product is especially recommended for alkali-resisting finishes, aerosol enamels, lead-free enamels, color-fast deep yellow coatings, and fume-resistant colors. Kentucky Color & Chemical Co., Dept. PVP, Louisville, Ky.



Weather testing translucent fiberglas for outdoor use in an Atlas Weather-Ometer at the Alsynite Company of America.

Weathering Qualities of Paints
can be pre-determined with speed and accuracy in the
WEATHER-OMETER®

The natural weathering effect of sunlight, moisture, thermal shock and rain is reproduced on a highly accelerated basis in the Weather-Ometer. The cycle to be used is controlled by the Cycle Meter which automatically regulates the length of the exposure to light and moisture under controlled conditions of temperature. Available with automatic control of relative humidity permitting exposures under conditions simulating the formation of dew.

Results are positive and dependable and any test program can be duplicated or repeated at any time.

A few of many users of
Atlas Weather-Ometers:

Radiant Color Co
National Lead Co.
Ford Motor Company
Harrison Paint & Varnish Co.
John Lucas & Co., Inc.
Rust-Oleum Corp.
Benjamin Moore & Co.
Reardon Co.
De Soto Chemical Coatings Inc.
Pratt & Lambert Inc.
Pittsburgh Plate Glass Co.
General Electric Co.
E. I. DuPont de Nemours & Co., Inc.
Glidden Co.
Cook Paint & Varnish Co.
Sherwin-Williams Co.

ATLAS ELECTRIC DEVICES CO.
4114 N. Ravenswood Ave., Chicago 13, Illinois U.S.A.

NEW MATERIALS — EQUIPMENT

FORK TRUCK
Carbon Pile Drive Control

A 4000 lb. capacity electric fork truck has been added to the company's line of battery-powered trucks.

Named the *EC-40*, the cushioned-tire, rider-type truck is equipped with carbon pile drive control, a new development which provides constantly smooth acceleration. Working through a hydraulic circuit, carbon pile control permits steady, stepless acceleration for "inching" operations, where loads must be placed delicately.

High torque, required for fast acceleration, is provided by dual field series windings in the drive motor. Dual fields improve efficiency of operation throughout entire speed range.

To facilitate maintenance, the contactor panel is located in the truck's counterweight and is protected by a steel cover. Easily detachable hood and side plates permit top and side removal of battery. Drop-down covers expose carbon pile resistor and hydraulic pump. Floorboard of truck can be readily removed to expose other internal parts.

Fully loaded the *EC-40* can climb a ten per cent grade, and can travel up to 6.2 mph forward or reverse. With standard upright, its lift speed loaded is 36 fpm and lowering speed is 70 fpm.

Standard nested roller uprights are used on the new model although a triple stage upright is available as optional equipment.

Dimensions of the *EC-40* are: overall length with 40-inch forks, 117-3/8 inches; wheelbase, 47 inches; width, 38 inches; aisle for right angle stacking, 82½ inches plus load length; weight, with 36-volt battery, approximately 7850 lbs.

Industrial Truck Div., Clark Equipment Co., Dept. PVP, Battle Creek, Mich.

ULTRAVIOLET ABSORBERS
No Acetic Groups

Two new ultraviolet absorbers, Uvinul N-35 and Uvinul N-38, are the first of a new family of UV absorbers which are chemically identified as substituted acrylonitriles. Unlike other available UV absorbers, they do not contain acidic aromatic hydroxyl groups and show excellent UV absorption properties under varying pH conditions. The absence of these acidic groups suggests uses of these new compounds in systems which would be adversely affected by their presence.

Uvinul N-35 and N-38 are particularly suitable for protecting nitrocellulose lacquers against UV degration, without adding undesirable color to the coating. They may also be of value in other systems such as butadiene-styrene latex, melamine-formaldehyde, urea-formaldehyde, epoxy-amine and nylon formulations.

Suggested applications include a variety of industrial and consumer product uses, including plastics, lacquers and paints, textiles, adhesives, packaging materials and paper-coatings.

Dyestuff and Chemical Div., General Aniline & Film Corp., Dept. PVP, 435 Hudson St., New York 14, N. Y.

URETHANE COATINGS
High Adhesion

New, balanced series of clear urethane coatings has been developed. Twelve different coatings, each with its particular characteristics, are included in the com-

TO THE RESCUE!!

PROBLEM: High Cost of Ester Gum Products.

SOLUTION: **FEGO** — Farnow's Interior Enamel Vehicle.

METHOD: Replace the resin solids of your present Alkyd and Ester Gum Combination with **FEGO** to gain the following advantages:

1. Better Gloss Retention
2. Easier Application
3. Better Flow, No Sag
4. Better Color Retention
5. Less Inventory, 1 Vehicle for 2
6. Lower Cost per Gallon
7. Excellent Package Stability, No Loss of Dry, Less Skinning

Prove it to yourself, let us ship you an introductory drum at the truckload price.

FROM THE MAKERS OF **FAFL**

FARNOW Varnishes

Emulsions - Alkyds

STillwell 6-1144

FARNOW, INC.
4-83 48th Avenue
Long Island City 1, N. Y.

plete series. The twelve numbers provide a range of coating characteristics that cover practically every need, performance characteristic, and application technique, according to the company.

Recommended as replacements for clear varnishes and lacquers and as special purpose coatings, the balanced series of coatings is formulated from four basic isocyanate resins. They provide tough, highly water-resistant finishes, plus high adhesion to many materials both rigid and flexible.

The coatings are being used for protective surfacing in both maintenance and the manufacture of new products. Typical maintenance uses include treatment of surfaces subjected to hard use such as floors and wall surfaces and surfaces much exposed to severe chemical or natural atmospheres. For new products, uses include coatings for industrial equipment, such as shuttles and filter plates, and as durable finishes for objects that receive much wear or exposure.

B. B. Chemical Co., Dept. PVP, Cambridge, Mass.

PROFIT MARGINS INCREASE . . .
WHEN THE BEST MIXER IS USED FOR EACH APPLICATION
There is only one Mixer that is the most efficient for each different mixing requirement — let us recommend the best Mixer for your use based on our wide variety of types and almost a century of experience.

• 1 Pint — 5000 gallon sizes.
• Standard designs, or with any modifications required.
• Also Three Roller Mills, Dry Grinding Mills, and other types of Mixing, Grinding and Dispersing Equipment.

Ross
Write for complete information!
CHARLES ROSS & SON CO., INC.
Leading mfgrs. of wet or dry grinding Mills, Kneaders and Mixers of all types—since 1849
148 CLASSON AVENUE, BROOKLYN 5, N. Y.

CODER-PRINTER
Anti-Friction Bearings

New and unique production coder and printer may provide the answer to the mess, fuss and expense of maintenance connected with fluid-ink, gravity-feed machines.

The Porelon plastic roller in the coder eliminates the need for fluid inks, solvents, ink fountains and reservoirs, transfer rollers and their maintenance. Each cylinder holds enough ink in suspension for up to 150,000 marking impressions. The Porelon plastic roller cannot drip or gum up—can be cleaned with one swipe of a damp cloth. When exhausted, it can be replaced in less than 15 seconds.

The fully automatic, friction operated coder is designed and engineered for continuous, rugged, trouble-free performance. It can be used to print from virtually any position including overhead, on any level surface of filled bags, packages, cartons, or shipping containers.

Anti-friction bearings guarantee continuous, trouble-free performance. Simple locking devices hold both the printing cylinder and the Porelon plastic cylinder in place, require a minimum of down time in changeover. An aluminum cover provides maximum protection from dust for all moving parts. A spare head is included with each coder.

The printing head of the Model 601 is 1″ in height, 15″ in circumference. Model 603 has a 3″ face printing surface with which up to three colors can be printed simultaneously.

Porelon plastic cylinders for the coder are available in violet, red, black, and green. Additional colors are presently under development.

Thomas Engineering Co., Dept. PVP, 9257 N. Laramie Ave., Skokie, Ill.

GAS BURNER
Alloy and Cast Iron

New, high-radiation type "H" burner is designed to provide from 150 BTU to 3,000 BTU per linear inch, depending upon gas-air mixture supplied. The heat release is the equivalent of from 45 to 900 watts per linear inch. Energy cost with this new burner is only a fraction of equivalent electrical energy cost. Combustion takes place completely within the fluted

refractory, which attains operating temperatures to 2600°F. when operated in the open.

The burner is particularly suitable for oven, conveyor, rotary drum and roll dryer applications.

Burner is available in two types: one, an alloy for the elevated temperatures, the other, of cast gray iron for open applications. Burners can be made in any desired lengths from 7″ to 100 feet or more.

Red-Ray Mfg. Co., Inc., Dept. PVP, 318 Cliff Lane, Cliffside Park, N. J.

THERMOMETER
Hand Calibrated

Accurate measuring of temperatures in deep vats, kettles, tanks, stacks, ovens, ducts, and other such vessels, is reportedly possible with new giant stem stainless steel thermometer. All units are ruggedly engineered to withstand pressures up to 3476 psi and can be used for both liquids and gases. It is calibrated for accuracies within 1% of the full scale reading.

Six ft. stem thermometers are available in temperature ranges from 0-200°F. to 200-1000°F. and is also supplied in centigrade calibrations. Large 5″ dial makes reading easy. Other dial sizes are 1-5/32″, 1-11/16″, 2-5/16″ and 3″.

W. C. Dillon & Co., Inc., Dept. PVP, 14620 Keswick St., Van Nuys, Calif.

STORAGE TANKS
500 Gallon Capacity

New polyethylene storage tanks in the 500 gallon capacity range, are said to retain all of the inherent characteristics of polyethylene with particular emphasis being placed on permanent corrosion resistance. Several styles are available—full open head, closed head with openings, flat or conical bottoms.

Access and drain fittings are available in wide choice.

Extensive field testing and on location experience shows no outer support is needed. Tanks are made in virgin natural polyethylene or black for outdoor storage.

Delaware Barrel and Drum Co., Dept. PVP, Wilmington, Del.

ACCURATELY DUPLICATE
BALL MILL
GRINDING ACTION!

McDANEL METAL JACKETED
CERAMIC LABORATORY MILL JARS

Quart, gallon and two-gallon sizes! Easy to discharge, clean! Rubber or neoprene gaskets! Low pickup, longest life! For cradle or roller mills.

Write for information today!

McDANEL Industrial CERAMICS

McDANEL
REFRACTORY PORCELAIN COMPANY
BEAVER FALLS · PENNSYLVANIA

PATENTS

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired (to foreign countries $1.00 per copy) to the publisher.

Putty Powders and Putty Compositions Made Therefrom

U. S. Patent 2,929,734. Brack B. McHan, Quincy, Ill., assignor to Calcium Carbonate Co. Chicago, Ill., a corp. of Ill.

A putty composition which exhibits a high degree of plastic flow, cohesion and adhesion with minimized combined oil vehicle requirements, said composition consisting essentially of a treated pulverized limestone powder and a drying oil vehicle in proportions yielding a putty like consistency, the powder particles being provided with surface coatings of a heavy-bodied and highly viscous drying oil applied to the particle surfaces prior to putty composition formation, the surface coatings ranging from 0.05% to 5.0% by weight of the powder.

Protective Coatings For Iron and Steel

U. S. Patent 2,927,089. Howard N. Copthorne, Fort Lauderdale, Fla.

A protective composition for iron and steel members consisting essentially of about 30% by weight of a reaction product of from about 30% to 65% by weight of a fatty acid having not less than sixteen and not more than forty carbon atoms, from about 30% to 65% by weight of litharge, and from about 2% to 10% by weight of sulfur; about 35% by weight of calcined gypsum; about 15% by weight of phenol-formaldehyde varnish; and in addition to the foregoing components volatile thinner in amounts sufficient to impart a consistency for coating said iron and steel members.

Room Temperature Curing Silicone Resins

U. S. Patent 2,934,519. Harlod A. Clark, Midland, Mich., assignor to Dow Corning Corp., Midland, Mich., a corporation of Michigan.

A resinous composition capable of curing in a thin film at room temperain air in 24 hours which comprises the reaction product of a mixture of two organopolysiloxane components in each of which each organopolysiloxane has attached to the silicon atoms by silicon-carbon bonds an average per silicon atom of from 1.2 to 1.7 monovalent hydrocarbon radicals of which from 0.25 to 1 radical per silicon atom is the phenyl radical and the remainder are alkyl radicals of less than seven carbon atoms, one organopolysiloxane component (A) being composed of organopolysiloxanes each of which has from 0.5 to 1.25 percent by weight silicon-bonded hydroxyls and the other organopolysiloxane component (B) being composed of organopolysiloxanes each of which has from 1.5 to 5 percent by weight silicon-bonded hydroxyl groups, components (A) and (B) being present in such proportions that a 50 percent by weight solution in xylene of the total organopolysiloxanes has a viscosity of from 50 to 150 cps. at 25°C., and from one to three molecules per silicon-bonded hydroxyl group contained in the total organopolysiloxanes A and B of an organosilane of the formula $RSi(OZ)_3$ in which each R is a monovalent hydrocarbon of less than four carbon atoms and each Z is an acyl radical of less than four carbon atoms.

Coating Composition

U. S. Patent 2,932,579. Roy A. Westlund, Jr., Oxford England and Michael J. Furey. Berkeley Heights, N. J. assignor to Esso Research and Engineering Co., a corporation of Delaware.

A hard film rust preventive composition which consists essentially of 99% to 95% by weight of a solvent cutback asphalt and 1% to 5% of the iron soap of an oxidized petrolatum, said solvent cutback asphalt consisting essentially of from 64.0 to 45.0 wt. percent of an asphalt having a softening point of from 160 to 170°F. selected from the group of reduced and reduced and oxidized asphalts with from 36.0 to 55°0 wt. percent of a petroleum naphtha having a boiling range of from 275: to 425°F.

RAYOX
Titanium Dioxide

NYTAL
Magnesium Silicate

PYRAX
Ground Pyrophyllite

PEERLESS CLAY
Domestic China Clay

THERMATOMIC BLACK
Low oil absorption Black

RHEOTOL
For leveling and Gloss

ACTIV-8
For Stabilization and Acceleration of Drying

NORVAN
Polyvinyl Acetate Emulsion

VANCIDE
Fungicide

DARVAN
Dispersing Agent

R. T. VANDERBILT CO. INC.
230 PARK AVENUE
NEW YORK 17, N. Y.

Carboxy-Copolymer Epoxide Compositions & their Preparation

U. S. Patent 2,934,516. Darrell D. Hicks, Louisville, Ky. assignor to Devoe & Raynolds Co., Inc., a corporation of New York.

A process for preparing thermoset resins which comprises (*a*) mixing (1) a polyepoxide selected from the group consisting of epoxidized esters and epoxidized diolefins, each having at least two epoxide groups; glycidyl polyethers of polyhydric alcohols; and glycidyl polyethers of polyhydric phenols; (2) a dicarboxylic acid-aromatic alcohol acid ester wherein the dicarboxylic acid is selected from the group consisting of maleic acid and fumaric acid, and the aromatic alcohol is selected from the group consisting of phenylcarbinol; the methyl, ethyl, propyl, and butyl, phenylcarbinol; phenethyl alcohol; the methyl, ethyl, propyl, and butyl, phenethyl alcohols; phenyl butanediol; the methyl and ethyl, phenyl butanediols; phenyl propanediol; and phenoxy ethanols and propanols; and (3) a vinylidene compound selected from the group consisting of styrene; the methyl styrenes; the halo styrenes; vinyl naphthalene; acrylonitrile; methacrylonitrile; N-alkyl and N,N-dialkyl amides of acids selected from the group consisting of acrylic and methacrylic acids, the number of carbon atoms in each N-alkyl radical not exceeding twenty; alkyl esters of acids selected from the group consisting of acrylic and methacrylic acids, the number of carbon atoms in the alkyl group not exceeding twenty; vinyl pyridine; vinyl furane; vinyl cyclohexane; monovinyl ketones of not over twenty carbon atoms; and vinyl halides; said mixture containing one to two epoxide groups of (1) per carboxyl group of (2) and from twenty to seventy percent of (3) by weight based on the total composition, and (*b*) heating the mixture at a temperature of 65°C. to 150°C.

Epoxide Resin Compositions

U. S. Patent 2,934,521. John E. Masters, Darrell D. Hicks, & William J. Belanger. Louisville, Ky., assignors to Devoe & Raynolds Co., a corporation of New York.

A process for preparing a resin which comprises at a temperature of about 80°C. to about 200°C. mixing and simultaneously contacting and reacting a glycidyl polyether of a dihydric phenol containing more than one epoxide group per molecule and having a weight per epoxide below 1000, a polyhydric phenol having at least two phenolic hydroxyls as its sole reactive groups, and a polycarboxylic acid anhydride in a ratio of two epoxide equivalents of glycidyl polyether to from 0.2 to 1.5 phenolic hydroxyl equivalents of polyhydric phenol to from 0.5 to 2 equivalents of the polybasic acid anhydride to produce an insoluble, infusible resinous composition, considering an anhydride equivalent as the weight of acid anhydride in grams per anhydride group, a phenolic hydroxyl equivalent as the weight of phenol in grams per phenolic hydroxyl group and an epoxide equivalent as the weight in grams of the glycidyl polyether per epoxide group.

Process for Latex Polymer

U. S. Patent 2,931,782. Kenneth Barry Jarrett, Welwyn, England, assignor to Imperial Chemical Industries Limited, London, England, a corporation of Great Britain.

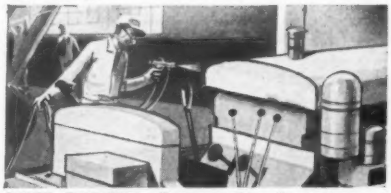
A process which comprises adding to an aqueous polymer latex made by the emulsion polymerization of vinyl chloride with from 0 to 30% of its weight of a compound selected from the group consisting of vinyl acetate and vinylidene chloride, formaldehyde and at least one water-soluble compound which is capable of reacting and forming thermoset resins therewith, said compound being selected from the group consisting of phenols, urea, thiourea and aminotriazines, and reacting the formaldehyde and the formaldehyde-reactable compound to form a coating of an insoluble resin on the surfaces of the polymer particles, the amounts of formaldehyde and formaldehyde-reactable compound used being such that the weight of coating formed is from 1 to 25 parts by weight per 100 parts by weight of the coated particles.

Paints Based on Portland Cement

U. S Patent 2,934,445. Kenneth Wilson Jones, Gravesend, Kent & Peter Joseph Hackson. Swanscombe. Kent, England, assignors to The London Associated

ALKYD MELAMINE BAKING ENAMEL—BENTONE 27 gellant provides uniform film thickness in dipping and baking.

EPOXY RESIN COATINGS—BENTONE 27 gellant boosts control over runoff, film thickness and flow during cure.


VINYL FINISHES—BENTONE 27 gellant steps up weather resistance, color uniformity, spraying properties.

POLYESTER GLASS-REINFORCED STRUCTURALS—BENTONE 27 gellant provides viscosity control before and during exothermic curing.

No problems in high polarity paints and compounds with BENTONE® 27, National Lead gellant

Specially developed thixotropic agent gives unique control over flow properties in medium to high polarity systems.

If your industrial coatings run and sag—or suffer from hard settling of pigments—here's good news: BENTONE® 27 *gellant smooths away most of your problems.* In vinyl and anti-fouling paints, for example, it prevents hard settling of heavy oxide pigments. In vinyl baking primers, it takes care of sag during curing. In epoxy resin enamel dip coatings, it helps to establish the amount you pick up in each dip, and promotes greater uniformity of film thickness.

How does BENTONE 27 gellant work in conventional alkyd and oleoresinous finishes? In other organic coatings and resin compounds? You find film integrity increased. Water resistance boosted. Color uniformity aided. Dependable control of viscosity. How well does BENTONE 27 gellant thicken solvents? It's highly efficient... and its efficiency appears to extend over a wide range of solvents—hydrocarbons, ketones, esters, alcohols, aromatics.

Get the full story. Write for our brochure and data sheets on BENTONE 27 gellant. Use the handy coupon for fast service.

NLC

National Lead Company, *General Offices:* 111 Broadway, New York 6, N.Y. KC-6298
In Canada: Canadian Titanium Pigments Limited, 1401 McGill College Avenue, Montreal
Please send descriptive literature checked below:

☐ B-21—BENTONE 27 in Industrial Finishes ☐ B-22—BENTONE 27 in Organic Solvents
☐ B-23—BENTONE 27 in Epoxies ☐ B-24—BENTONE 27 in Polyesters

Name_____ Title_____
Firm_____
Street_____
City & Zone_____ State_____

BENTONE® 27
(Gellant)
A Chemical Development
of National Lead Company
General Offices: 111 Broadway, New York 6, N.Y.

Portland Cement Manf. Limited. London, England, a corporation of Great Britain.

A dry and free-running paint composition consisting essentially of Portland cement, a water-repellent compound selected from the group consisting of stearic acid and esters and salts of stearic acid, and 0.05-2% by weight of an aliphatic primary monoamine having 6-10 carbon atoms per molecule, including mixtures of such amines, the ratio of the proportions of amine and water-repellent material present being in the range of from 0.1-4.0.

Protein and Nonionic Agent Compositions

U. S. Patent 2,933,406. King, Mexico City, Mexico, assignors to The Borden Co., a corporation of New Jersey.

In making a coating and film forming composition for use in aqueous solution, to leave on drying a film substantially free from microscopic pinholes and other imperfections caused by retained air, the process which comprises mixing an adhesive consisting essentially of alkali soluble protein in dry form containing not more than 15% of water on the weight of the protein and selected from the group consisting of casein, soy protein, and gelatine with a nonionic surfactant serving as a bubble release agent and selected from the group consisting of water- and ether-soluble surface active ethers, esters, ether-esters, and ether-alcohols in the proportion of 1-10 parts by weight for 100 parts of the protein, and maintaining the contact between the protein and the nonionic surfactant and continuing the mixing in dry condition until the agent becomes in part non-extractable from the mixture by ether.

Modified Polyesters

U. S. Patent 2,934,513. Darrell D. Hicks & John E. Masters, Louisville, Ky., assignors to Devoe & Raynolds Co., Inc., a corporation of New York.

A process for the production of thermoplastic polyesters which comprises concomitantly reacting, a monoepoxide, a dihydric phenol and a dicarboxylic acid anhydride at an elevated temperature below which water of esterification is formed, said dihydric phenol being selected from the group consisting of mononuclear and polynuclear phenols, said monoepoxide being selected from the group consisting of oxirane, alkyl oxiranes, and ethers and esters containing only one three-membered epoxide substituent, each free of substituents capable of reacting with an acid anhydride group, the molar ratio of dicarboxylic acid anhydride to monoepoxide being from $n{:}n$ to $n{:}n{+}2$ where n represents the number of mols of anhydride, and the molar ratio of anhydride plus monoepoxide to dihydric phenol being greater than 4:1.

Epoxy Resin Compositions

U. S. Patent 2,934,520. George Mayurnik, Garfield, N. J. assignor to Aries Laboratories, Inc., New York, N. Y., a corporation of New York.

The heat condensation product of a resinous glycidyl polyether of a polyhydric phenol which ether is free from functional groups other than epoxy and hydroxy groups, and an amount sufficient to react with all the epoxy groups present of a mixture of two dicarboxylic anhydrides selected from the group of mixtures consisting of monomeric adipic and succinic, monomeric adipic and phthalic, monomeric adipic and sebacic, polymeric adipic and monomeric phthalic, polymeric sebacic and monomeric phthalic, and polymeric adipic and monomeric sebacic anhydrides, the molar proportion of the dicarboxylic anhydrides in said mixture ranging from about 1:1 to 1:2.

Rust-Preventing Agent

U. S. Patent 2,933,400. Eberhard Wurbs, Pfungstadt, near Darmstast Germany Anna Wurbs, nee Siegnund and Ulrike Wurbs, joint heirs of said Eberhard Wurbs, deceased, assignor to Bruno Stegmund, Wetzlar, Germany.

A coating composition having rust-preventing properties due to its content of metal powders having differing positions in the electromotive series of the elements, consisting of 100 to 120 kg. of a varnish, 30 to 32 kg. iron powder, 62 to 80 kg. of a second polyvalent metal selected from the group consisting of magnesium, zinc, lead and a mixture of the same, as well as 4 to 8 kg. of an oxide of the second metal, and containing 30 to 40 kg. activated carbon.

Two new R-B-H pigments, Interchem Regal Orange and Interchem Patrician Yellow, are well worth investigating as sun-fast, bright tinting colors for architectural and latex paints.

Available dry, dispersed or in presscake form.

Write for samples.

R-B-H Dispersions

INTERCHEMICAL CORPORATION
Color & Chemicals Division
HAWTHORNE, New Jersey

Pigment dispersions in nitrocellulose; ethyl cellulose; urea formaldehyde; vinyl and alkyd resins; chlorinated rubber and other plastic binders.

R-B-H, Interchem, Regal Orange and Patrician Yellow are trademarks of Interchemical Corp.

TECHNICAL Bulletins

CARBON DIOXIDE

New twenty-four page booklet on carbon dioxide (CO_2) and its value to industry has just been issued. The liberally illustrated booklet covers the history, principal applications, properties, manufacture, supply and distribution of carbon dioxide in gaseous, liquid and solid ("Dry-Ice") form.

A compendium of valuable information, this new booklet contains all the data necessary for readers to gain a clear understanding of how this versatile chemical can be used in industry today.

One of the major features of the booklet is the section concerned with various supply systems used to provide carbon dioxide according to the particular needs of the user. The flexibility and adaptability of these systems from a single cylinder of CO_2 to the large 100-ton capacity receivers are described. Specialized regulating equipment and controls for carbon dioxide are also covered.

Pure Carbonic Co., Div., of Air Reduction Co., Inc., Dept. PVP, 150 East 42nd St., New York 17, N. Y.

MATERIALS HANDLING

Standardized plant and warehouse handling equipment is described in a new catalog issued by the company. Copies are available upon request.

Items include stacking storage bins with a 4-way lift truck entrance, automatic dump boxes with gravity latch lock and automatic side dump trailer trucks.

A hand dump truck and a special heavy duty warehouse truck, multi-purpose cart, shovel, beverage and barrel trucks, carboy truck with gripping yoke, industrial dust pan, combination truck and drain rack features automatic loading, stock checker's truck with self-contained writing table and stationery rack, machine tender cart, and utilities racks with two and three shelves.

Barrel and box grabs, drum and barrel slings, wire rope slings, toggle type barrel cradles, an all-steel barrel and box skid, vertical drum lifter, and universal grab with adjustable spread.

Special sizes and capacities will also be built to customer specifications.

Palmer Shile Co., Dept. PVP, 12622 Mansfield, Detroit 27, Mich.

DRUM MIXING

Publication of a new 12-page bulletin describing complete line of drum mixing equipment is announced.

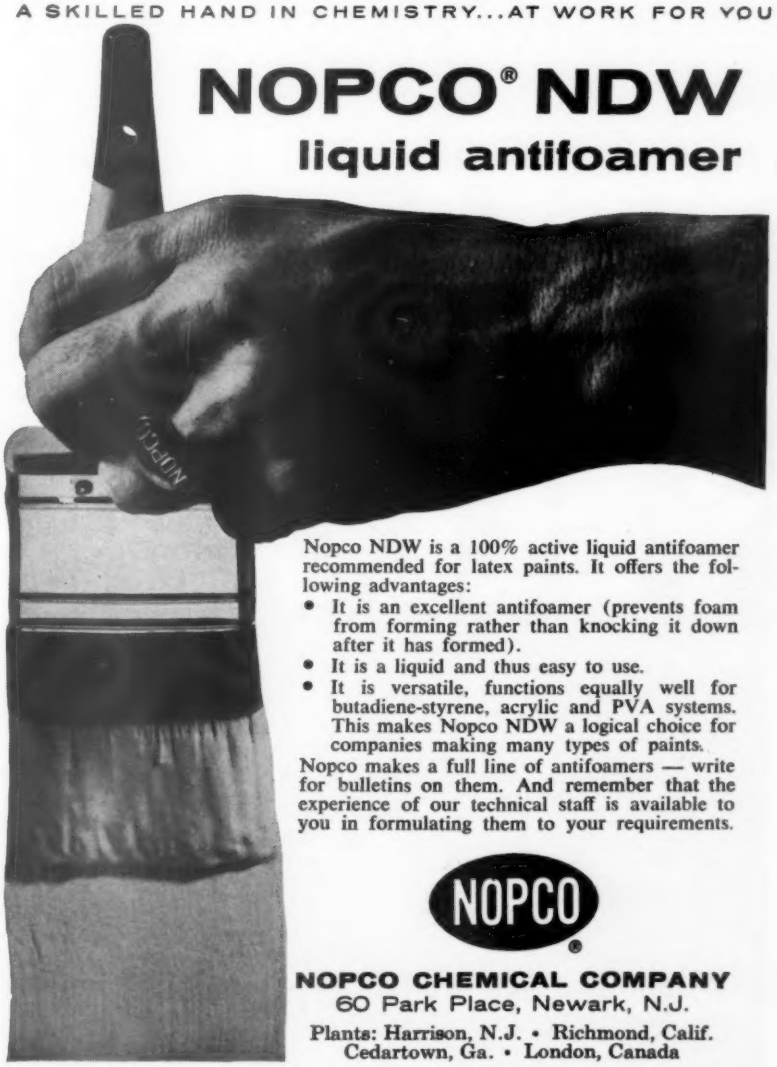
The new bulletin DM-290 highlights an expanded line of five standard sizes of heavy-duty fiber drum tumblers now available with new design features such as quick-release drum holders, floor-level loading and build-in drum extenders. In connection with these new units, the bulletin shows a series of drum tumbler loading charts from which the required size of drum tumbler can be readily determined according to the size of drums and weight of loads.

The literature also contains illustrations and specifications for drum rollers, conical blenders, tumble-mixers, "rocker-roll" mixers and other special units and accessories for performing all types of drum mixing and blending operations. A complete description of each unit is given along with recommended applications.

Process Equipment Div., The U. S. Stoneware Co., Dept. PVP, Akron 9, Ohio.

A SKILLED HAND IN CHEMISTRY...AT WORK FOR YOU

NOPCO® NDW
liquid antifoamer



Nopco NDW is a 100% active liquid antifoamer recommended for latex paints. It offers the following advantages:

- It is an excellent antifoamer (prevents foam from forming rather than knocking it down after it has formed).
- It is a liquid and thus easy to use.
- It is versatile, functions equally well for butadiene-styrene, acrylic and PVA systems. This makes Nopco NDW a logical choice for companies making many types of paints.

Nopco makes a full line of antifoamers — write for bulletins on them. And remember that the experience of our technical staff is available to you in formulating them to your requirements.

NOPCO®

NOPCO CHEMICAL COMPANY
60 Park Place, Newark, N.J.
Plants: Harrison, N.J. • Richmond, Calif.
Cedartown, Ga. • London, Canada

LABORATORY SUPPLIES

A 344-page, fully illustrated catalog which covers a complete line of laboratory apparatus has just been released.

The catalog includes the full line of Chemplast teflon laboratory ware, and Nalgene polyethylene ware.

Fischer & Porter Co., Dept. PVP, 488 Jacksonville Road, Warminster, Pa.

EXTENDER PIGMENTS

Performance characteristics of extender pigments in latex paints for masonry is the subject of a data sheet just published. Bulletin reports the results of accelerated weathering tests on cinder blocks painted with red, green and white paints containing aluminum silicate, magnesium carbonate, and calcium carbonate extenders at various loadings.

Results reported include general appearance, chalking, color retention, micro-cracking and efflorescence. Latexes compared are 100% acrylic, polyvinylacetate copolymer and polyvinylacetate homopolymer. Recommended formulas and properties of the paints are reported in tabular form.

Minerals & Chemicals Corp. of America, Dept. PVP, Essex Turnpike, Menlo Park, N. J.

SPRAY WASHING

A brochure which describes three models of machines for high pressure spray washing of paint masks is being offered.

Time and labor saving, protection of fine wire bridging on masks and low solvent consumption are features.

Conforming Matrix Corp., Dept. PVP, 402 Toledo Factories Building, Toledo 2, Ohio.

SURFACE ACTIVE CHEMICALS

New bulletin describes the applications and tabulations of the properties of 37 representative nonionic surface active chemicals.

The chemicals listed are typical of the wide range of non-ionics available from the firm. The products are divided into four groups: glycerol esters, other polyhydric alcohol esters, polyglycol esters, and polyoxyethylene alkyl aryl ethers. The new bulletin suggests the considerable variety of chemicals that are available within each of the groups.

Hodag Chemical Corp., Dept. PVP, 7247 N. Central Park, Chicago 45, Ill.

VARIABLE CAPACITY PUMP

New line of variable capacity rotary pumps is described in an eight-page bulletin just released.

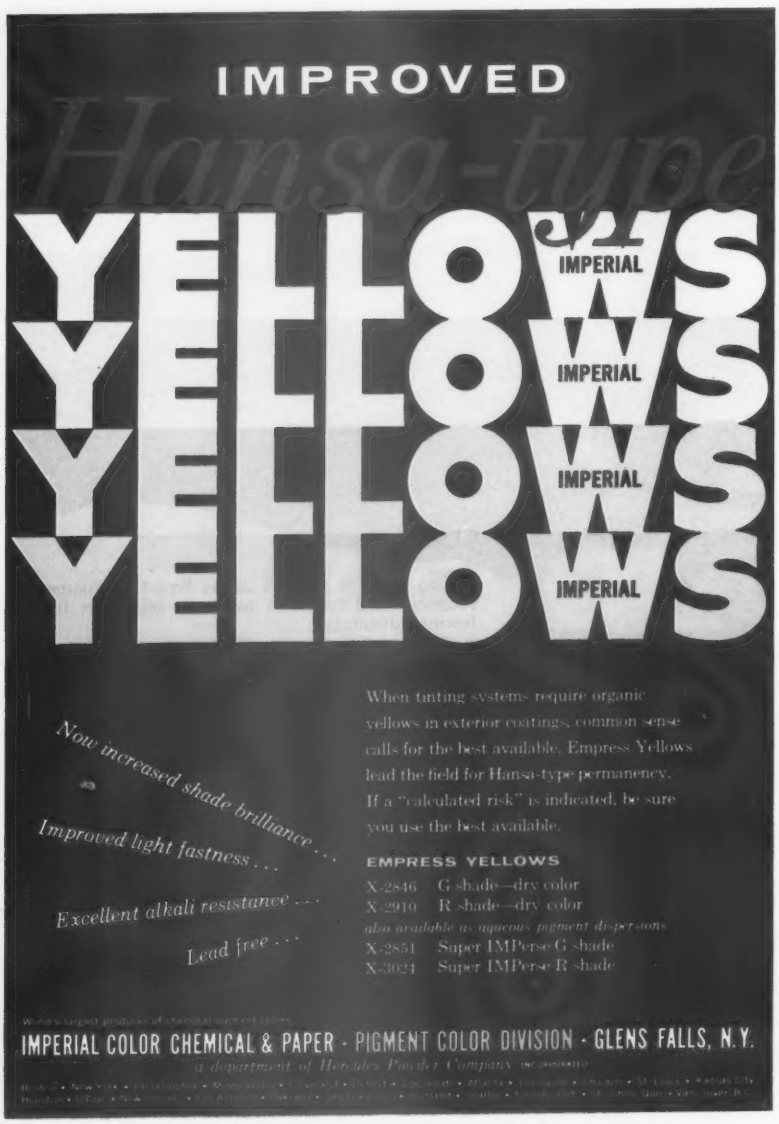
According to the bulletin, this new pump, called the "Vari-Flow," now makes it possible to "dial" any desired flow rate, from zero to full capacity, without changing pump speed. Formerly this type of control required variable speed drives, but the new Vari-Flo achieves the same result using a standard fixed-speed motor.

Bulletin 600 explains in detail the unique principle of operation that gave rise to the Vari-Flo design. It includes cutaway illustrations of four basic models, which are offered in a choice of ball-bearing or packing-gland types, and in three sizes up to 450 gallons per minute.

The bulletin also provides a complete guide to selection of Vari-Flo pumps, including a step-by-step outline of selection procedures, application data tables, and performance curves.

A final point covered in the literature is a basic discussion of simplified liquid proportioning, which the company claims is now possible with the use of special systems incorporating one or more Vari-Flo pumps.

Blackmer Pump Co., Dept. PVP, Grand Rapids 9, Mich.


IMPROVED
Hansa-type
YELLOWS
IMPERIAL
IMPERIAL
IMPERIAL
IMPERIAL
Now increased shade brilliance . . .
Improved light fastness . . .
Excellent alkali resistance . . .
Lead free . . .
When tinting systems require organic yellows in exterior coatings, common sense calls for the best available. Empress Yellows lead the field for Hansa-type permanency. If a "calculated risk" is indicated, be sure you use the best available.
EMPRESS YELLOWS
X-2846 G shade—dry color
X-2910 R shade—dry color
also available as aqueous pigment dispersions
X-2851 Super IMPerse G shade
X-3024 Super IMPerse R shade
IMPERIAL COLOR CHEMICAL & PAPER · PIGMENT COLOR DIVISION · GLENS FALLS, N.Y.
a department of Hercules Powder Company

HOW THE SILICONES MAN HELPED...
CUT COSTS OF HOT STACK PROTECTION

HEAT RESISTANT to 1200 deg. F., a low-cost, high-temperature silicone-aluminum paint using UNION CARBIDE R-64 Silicone has protected this exhaust stack for six months. And the stack is still like new.

This despite the fact that the stack—on a gas-fired, high-temperature fluid heater—has operated continuously at 1000 deg. F., with intermittent exposure to corrosive (HCl) atmosphere.

Formulated by a specialty paint manufacturer, the paint is based on R-64 silicone resin and aluminum pigment. The resin, recently introduced by the UNION CARBIDE Silicones Man, is especially designed for cold blending with alkyd, melamine, and acrylic type baking enamels to give them improved color and gloss retention, thermal stability, and resistance to weathering. Aluminum-pigmented R-64-alkyd blends have all the high-temperature properties of straight silicone-aluminum paints—with important cost savings.

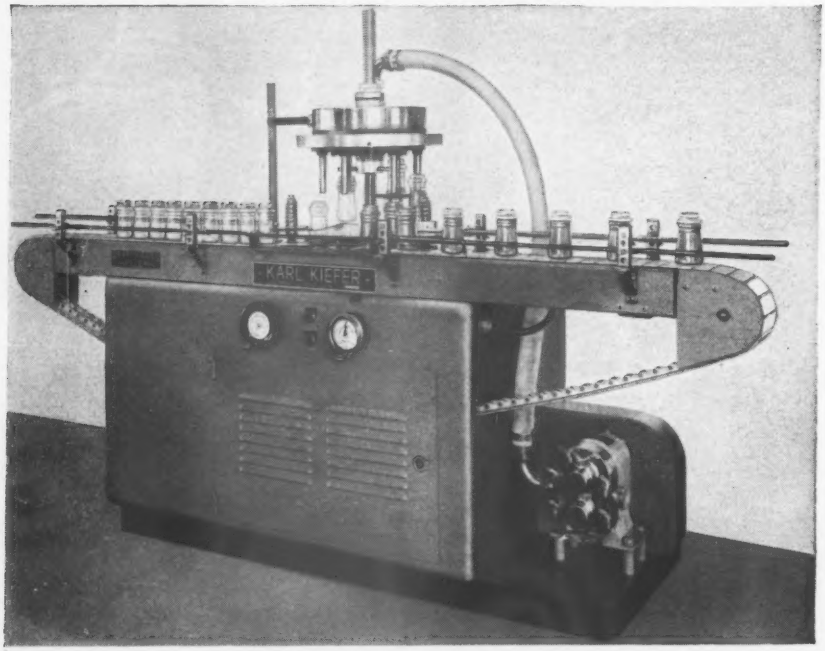
For performance data and proven formulae, write to your Silicones Man or Dept. FQ-6001 Silicones Division, Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. *In Canada:* Bakelite Company, Division of Union Carbide Canada Limited, Toronto 7.

Unlocking the secrets of silicones
Rubber, Monomers, Resins, Oils and Emulsions

The term UNION CARBIDE is a registered trademark of UCC.

UNION CARBIDE SILICONES

with this KIEFER CADET PRODUCTION marches on and on...



CAUTION: don't try to match the KIEFER "CADET" VARI-VISCO FILLING MACHINE. . . it just cannot be done! Fills small samples to gallon paint containers, day after day. . .simply, enviably, efficiently.

Has automatic feed and discharge conveyor. . .container lift for a "BOTTOM UP" fill. Gives your viscous materials a solid volumetric pack. . .also a volumetric fill of liquids, WITHOUT SPLASH.

Wonderful

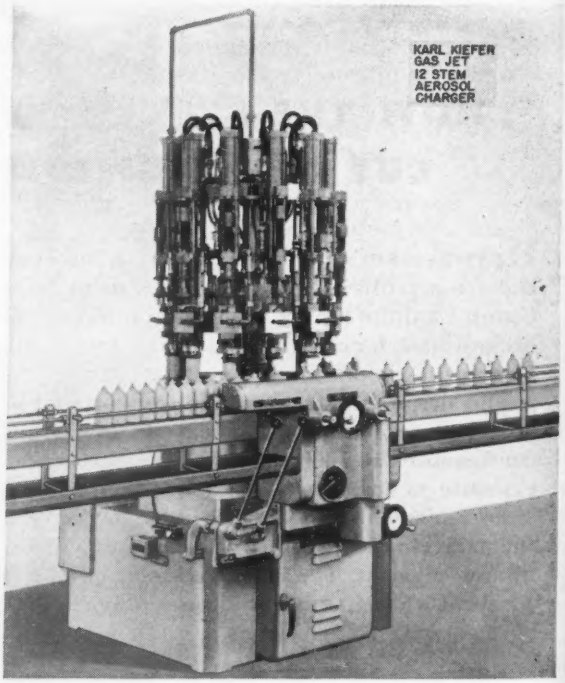
KARL KIEFER

"Gas Jet"

AEROSOL CHARGERS

In this development KARL KIEFER again leads, in deftly and precisely measuring propellant gas. SPEEDS UNLIMITED—built in a wide range of production rates.

Brochure with valuable information ready for you —write us today!



The Karl Kiefer Machine Co.

ESTABLISHED 1890

933 MARTIN STREET CINCINNATI 2, OHIO

NEW YORK • BOSTON • CHICAGO • SAN FRANCISCO • PHILADELPHIA • TORONTO • HOUSTON • VANCOUVER • SAVANNAH • LOS ANGELES • LONDON, ENGLAND

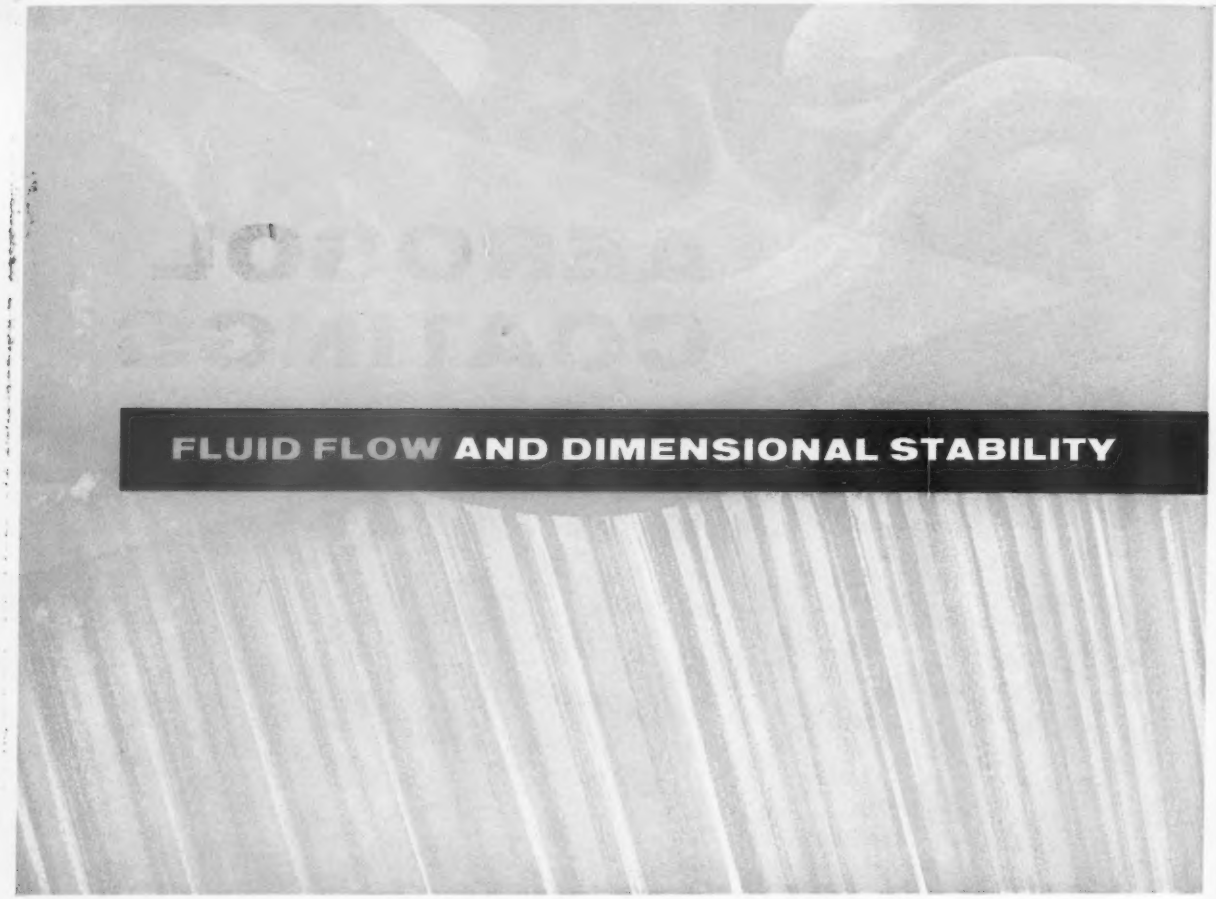
AEROSOL COATINGS

PACKAGING

FORMULATION

PRODUCTION

A completely automatic high-speed aerosol filling line has been installed by Minnesota Paints, Inc. This ninety year paint firm sold their first aerosol package only two and a half years ago. Their new equipment, a completely integrated line, was built by the Katridge Pak Company.



Picco aromatic plasticizer

Aromatic Plasticizers, a series of neutral hydrocarbon polymers, are available in a range of viscosities and solvent-power. Long experience in a variety of applications, including rubber elastomers and various resinous systems, indicates Aromatic Plasticizers have performed in primary and in secondary functions. They are produced in large quantities which provides uniformity and low cost advantages in compounding plasticizing systems.

Use coupon to obtain literature and samples.

PENNSYLVANIA INDUSTRIAL CHEMICAL CORPORATION · PICCO · CLAIRTON, PENNSYLVANIA

The trademark of quality

PENNSYLVANIA INDUSTRIAL CHEMICAL CORPORATION
CLAIRTON, PENNSYLVANIA

Pennsylvania Industrial Chemical Corp., Clairton, Penna. (PVP)

We would like to test Picco Aromatic Plasticizer for (describe application)_____

Name_____ Title_____

Company_____

Address_____

PROBLEMS IN FILLING AEROSOL PAINTS

By

E. G. Roberts

TO understand the problems of filling aerosol paints it is necessary to consider some of the fundamentals of filling all aerosols.

The two basic methods of filling aerosols have been described as the cold, or refrigerated fill, and pressure fill. The significance of these terms is apparent when it is realized that liquified gas propellents have high vapor pressures which prohibit normal liquid filling. For this reason the propellents must be "chilled", that is, refrigerated to low temperatures, frequently —20°F. for liquid filling. The only alternative is pumping the gases under pressure "back through" the dispensing valves after the valve cup has been clinched on the container.

Both methods utilize two-stage filling. In cold fill the product concentrate (non-propellent), also chilled, is first liquid filled followed by the cold liquid propellent mixtures. Both of these are put in the can through the one inch top opening before the valve cup is clinched on. On the other hand in pressure filling, the product is liquid filled at room temperature, the valve clinched, and propellent filled through the dispensing valve itself.

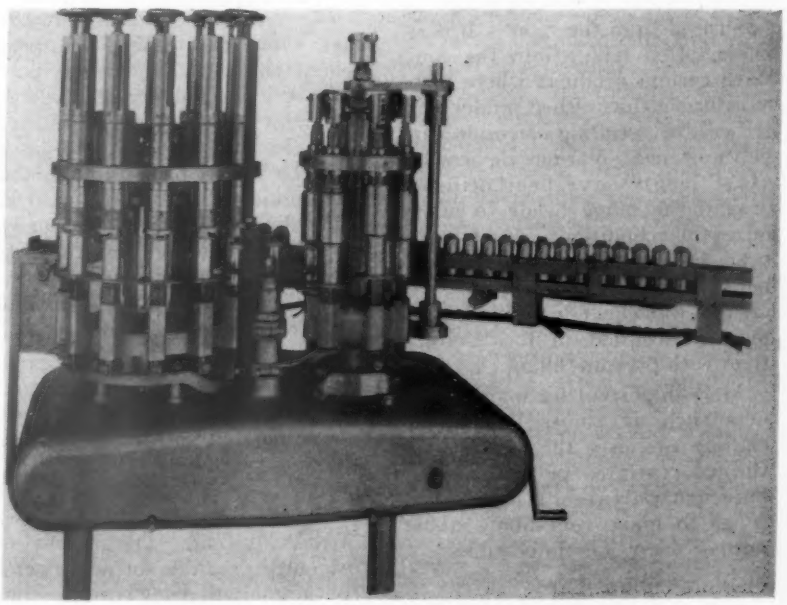
Much ink has been spilled on the relative merits of the two methods of filling. Both are used widely in the industry today. For aerosol products with a high percentage of propellents, insecticides with 80 to 90%, the predominant fill is cold whereas for foams as shave creams where the propellent is only 6 to 8%, pressure filling is almost exclusively used.

A consideration of the advantages and disadvantages of each method is necessary to understand the state of the art of aerosol filling today.

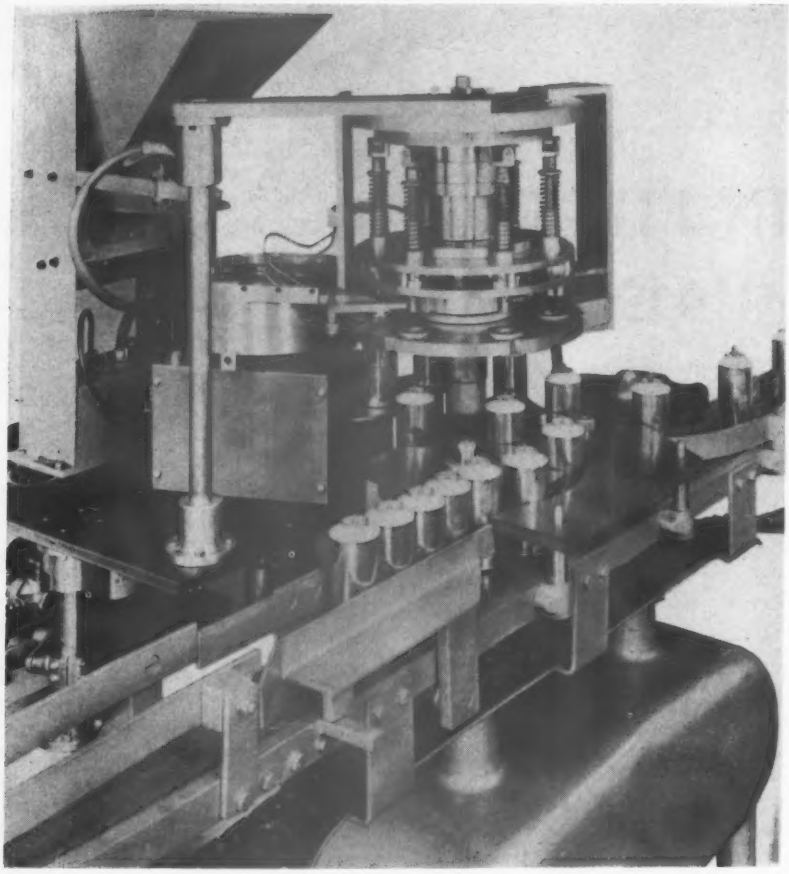
Cold Filling

The obvious major disadvantage of cold filling is the expensive refrigeration equipment required for an installation. This is especially true since in two stage filling into the open top can, both the product concentrate and propellent must be chilled and handled separately. If the cold propellent were poured on top of the room temperature concentrate already in the can, excessive boiling and spillage would result. Furthermore, since most non-food aerosols must be heated for testing in a hot water baths subsequent to filling and closing, the energy utilized in reversing the cycle is great. Most heating engineers shudder on first seeing an aerosol installation.

Another problem of cold filling is that as the propellent is dropped



Combination rotary crimper and pressure filler.



Rotary tipper.

from the filling nozzle into the open can, considerable vaporization occurs which results in costly propellent losses. The difficulty is further compounded in that the vaporization, moisture is condensed from the room's atmosphere, often falling into the can. With certain products where high moisture in the finished products is critical the resulting corrosion can be disastrous. Various devices or attachments have been utilized around the filling heads to minimize this condition. Most have been only partially successful. Usually, then cold filling results in greater propellent loss and higher moisture content in the product than with pressure filling.

More important for many products such as paints and soaps, chilling so raises the viscosity of the concentrate, or with water base materials results in freezing, so as to make cold filling under normal operations impossible.

Pressure Filling

Considering all the disadvantages of cold filling it can be asked: "Why consider this method at all?" This is only because pressure filling as practiced today also has its weakness for many products.

The most apparent of these is that while back filling the propellent through the valve is possible, it is often a very slow operation with today's valve construction. In most of these, the gases must be forced back through the same orifices (.015"-.030") used in controlling the flow of the finally dispensed product. Pressure filling then is only practical for low propellent concentration products when high speed filling is desired.

Another disadvantage of pressure filling is that while in cold filling, purging occurs, oxygen is not eliminated by pressure gassing the closed container. This purging occurs as the propellent vaporizes in the open can before the placing of the valve cup. The removal of oxygen is desirable for many aerosols not only to delay corrosion but also to prevent the compressed air from raising abnormally the final pressure in the container. With pressure filling, evacuation of the air is only possible by introducing a vacuumizing step in the filling cycle before gassing. This further slows up the operation.

For paints where much chilling is impractical the pressure method of filling is most widely used even though the propellents may be 50 to 60% of the mixture. This method also minimizes the equipment and lines needed for mixing the various colors. With the trends towards many colors in a complete aerosol paint line, often several hundred, small mixing tanks with short lines pumping directly to the filler is more and more the answer in most factories.

The aerosol industry has available a number of answers to speeding up pressure filling operations which most engineers consider the trend of the times.

These improvements are as follows:

(1) Improved valve design to facilitate pressure filling.
(2) "Under the cup" gassing.
(3) Higher speed rotary gas filling equipment.
(4) Mixing of concentrate and a part of the propellent and filling both at room temperatures.

The only means of overcoming the slowness of gassing paint valves is their radical redesign so that the propellents are filled through larger auxiliary orifices which are inoperative when the valve is actuated for dispensing. Such a redesign is costly and presumably would result in considerably higher valve prices.

The availability of rotary gassing equipment whereby the longer filling cycle for pressure filling is compensated for by multiple head units appears imminent. With the trend towards larger companies being involved in the production of aerosol equipment the engineering of such high speed units is now feasible.

"Under the cap" filling makes possible higher speed gassing. By this method the one inch cup and valve is held suspended just above the can opening in a pressure chamber. In the first stage the propel-

lent under pressure is pumped around the valve cup, the cup dropped into position and then clinched in the same chamber. Such an operation has been utilized to a small degree in the industry but to our knowledge has not been built into high speed equipment.

The additive method for speeding up filling is based on partial premixing of the concentrate and propellent. This procedure has been described by Bower and Appenzeller (1). We quote from their article:

"The object of this study was to explore the possibility of loading a mixture of concentrate and a portion of the propellent at atmospheric pressure and ambient temperature. The balance of the propellent is then pressure loaded in the usual manner. Since all operations are conducted at ambient temperatures, the problems connected with refrigeration are eliminated. Purging is effected automatically by the vaporizing propellent, thus eliminating the troublesome purging step of pressure filling. Any propellent which can be added to the open container will reduce the quantity of propellent to be loaded through the valve, thus relieving a part of the time disadvantage of pressure filling."

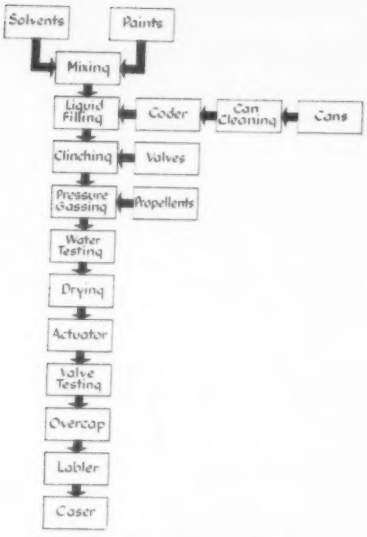
In the tests the investigators used commercial formulations of insecticides, hair sprays and paints. The following proportions of ingredients gave promising results:

35.5% concentrate
61.5% Freon 11
3.0% Freon 12

This liquid was filled at room temperature and the remainder of Freon 12 was pressure filled to reach the final formulation. Based upon their work the authors concluded:

"that loading a self-purging concentrate offers several possibilities of improvement over presently used filling methods. The refrigeration problems associated with cold filling can be avoided, as can the purging problems normally connected with pressure filling. Loading time and purging efficiency are comparable to those now being obtained."

"There are still mechanical problems to be solved. For instance, it may be necessary to provide



Filling layout of aerosol paint.

filling bowls and associated fixtures which can withstand 5-10 psi pressure, to avoid excessive losses from the concentrate-propellent mixture. Large, smooth filling noozles would help to avoid the turbulence which contributes to the frothing problem."

Propellent Blending

Another aspect of aerosol filling which has made much progress in the past several years has been the storage of solvents and propellents. Bulk delivery and storage of propellents have become a necessary way of life for most loaders. With the increase in number and variety of aerosols the trend has been away from storage of mixed propellents towards the bulk storage of the more common gases and their blending at the time of filling. This has meant the introduction of new techniques and methods for the industry.

The blending of propellents has been described by E. E. Husted(2) according to five systems:

1. Weight tank mounted on a scale or hydraulic weighing system.
2. Positive displacement proportioning pumps.
3. Displacement meter to a batch tank.
4. Radiation equipment measuring liquid density.
5. Continuous proportioning system."

All of the methods have certain advantages or problems but with all, two basic principles are involved with accurate blending. These are that at all times the propellents must remain liquid and with changes in temperature there are marked changes in the density of the liquid gases.

All of the systems are practical. The first method, weight tank, requires little investment in equipment. It involves simply the pumping of each component gas successively into a pressure tank, controlling the amount by successive weighing. A circulating pump is used to insure mixing. The method is obviously slow, the flexibility low and inaccuracies high.

The proportioning pump method appears economical only for a pressure filling line but requires more equipment particularly a heat exchanger on the suction side of the pump. The cost of such a system capable of delivering at least 15 gallons of mixture per minute is about $8,000.

The displacement meter method is basically the same as the first weight tank except the various blends are metered into the mixing tank.

The radiation equipment method measures the density of the mixture and after conversion to electrical energy activates a control to each of the propellent lines and continuously compensates for changes in mixture composition.

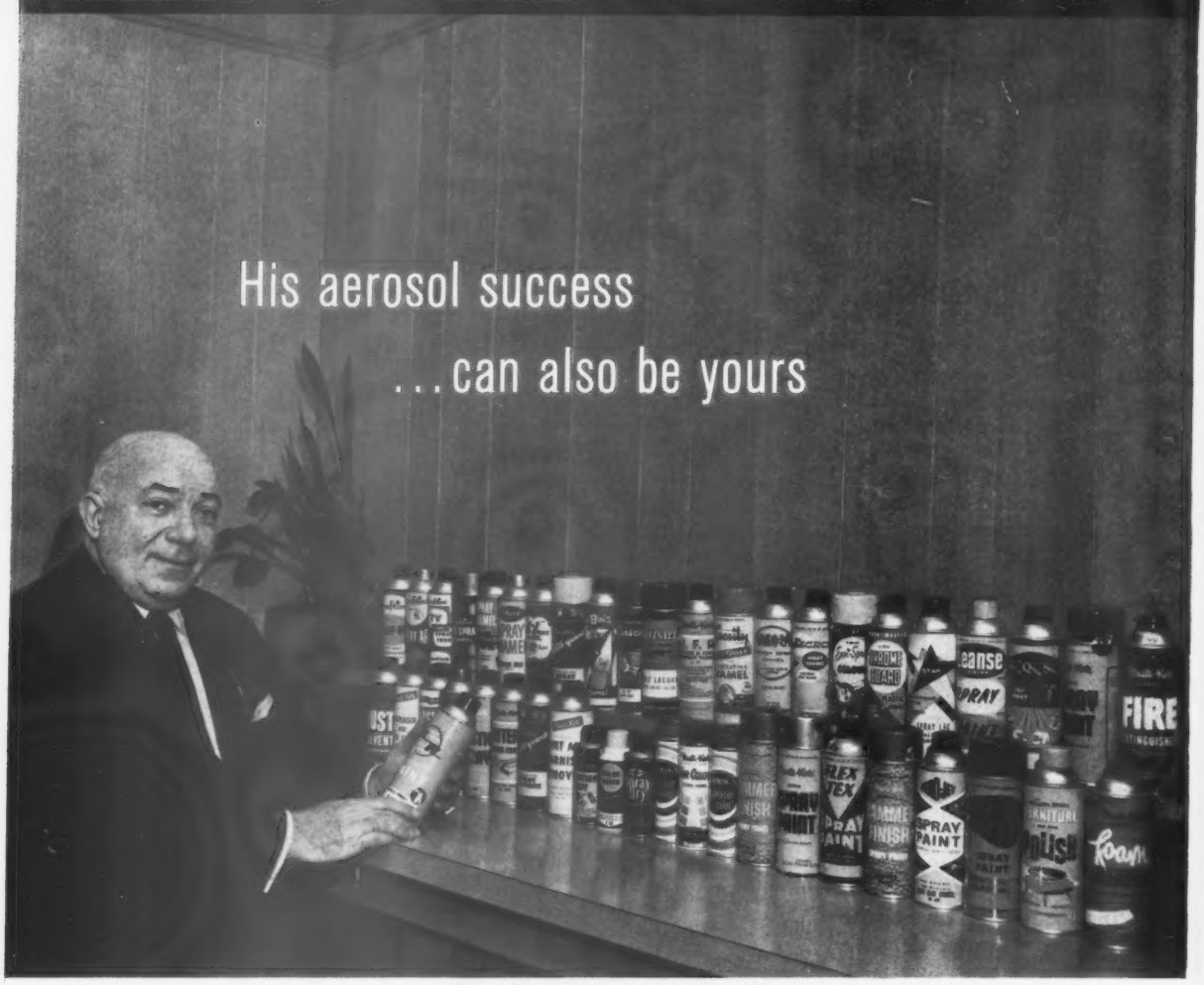
Continuous proportioning appears to offer the greater ease of operation and maximum flexibility though greater capital investment is required. By this means individual metering devices are hooked to each bulk tank and through suitable gearing to a second meter which integrates the control of one component to another. Obviously, the cost is higher but appears to offer the greatest efficiency for large installations.

The aerosol industry has grown by its ever expanding product line. Further growth, particularly for products such as paints, will come with lower costs and prices to the consumer which can only come about through increased filling efficiencies.

References

1. Bower, F. A. and Appenzeller, Robert G., "An Improved Method of Loading Aerosol Containers." Proc. C.S.M.A. Dec. 1957.
2. Husted, E. E., "Blending of Aerosol Propellants" Proc. C.S.M.A. May, 1959.

The contract packager had the answer... *another success story from the ISOTRON file.*



Elias Shapiro, Executive Vice President of Plasti-Kote, Inc., and a few of the more than 500 aerosol products packaged by the firm for its own and customer use.

How do you make sure your new aerosol product reaches the market without a hitch? One good answer: Go to a contract packager like Plasti-Kote, Inc., of Cleveland, which has successfully formulated and packaged its own products. Marketer of scores of aerosol paints, finishes and similar products under its own name, Plasti-Kote also packages hundreds of different aerosol products for a long list of customers.

Plasti-Kote's experience with over 500 pushbutton products, extensive research facilities, and knowledge of aerosol marketing and merchandising are at your disposal. When you do business with Plasti-Kote, you're assured of a good basic product, a "fool-proof" package and strong identification at the point of sale.

If you're thinking of "going aerosol", the services of a contract packager will be invaluable to you. In addition to formulation, his recommendation of the proper can, valve and propellent for your product is of major importance. More than ever, packagers specify ISOTRON®—the extra-pure, extra-dry, factory-sealed propellents that help insure important repeat sales of your product.

ISOTRON—*The Key To Modern Living*

Pennsalt® Chemicals
ESTABLISHED 1850

Isotron Department 363
PENNSALT CHEMICALS CORPORATION
Three Penn Center
Philadelphia 2, Pa.

Aerosol Developments

Stronger Can Side Seam Takes Greater Pressures For Longer Periods

Continental Can Co. has developed the "Tricom" solder aerosol can which has greater side seam bond stability and will hold higher pressures at elevated storage temperatures for longer periods than the conventional soldered 3-piece can now in use. To the aerosol packaging industry this Continental "first" means better protection and longer life for most aerosol products.

Since the introduction of the aerosol can, the conventional soldering method was used on all 3-piece cans. This two-component soldering system limited the selection of propellant mixtures to those which could be tolerated by the can structure. Continental has fortified the conventional bi-metallic soldering system into a three-component one. After three years of intensive investigation and research involving extensive control storage studies with various products, the company has determined that this new aerosol container shows superior shelf life performance over any other 3-piece package.

This important packaging development should help pave the way for further growth and expansion in the aerosol industry since it makes possible applications previously considered impossible because of the pressure restrictions imposed on the propellant system selection. Continental, the company that developed the original 3-piece low pressure aerosol can which started the aerosol revolution, makes 3-piece aerosol cans ranging from 3 oz. to 16 oz. capacity for products of varying physical and chemical properties, such as hair spray, shave cream, paint, insecticides, deodorants, shoe polish and cleaners, antiseptics and furniture polish. The new "Tricom" aerosol can will be made in the full range of styles and sizes manufactured by Continental and will be offered for all products requiring the added benefits of the new container.

Minnesota Paint Installs Automatic Filling Line

A completely automatic high-speed aerosol filling line has been installed by Minnesota Paints, Inc., a 90 year old paint and varnish manufacturer which sold its first aerosol package only two and a half years ago. The company's new equipment, a completely integrated line built by The Kartridg Pak Co., Franklin Park, Ill., is believed to be the first aerosol paint filling line in the northwest.

Mr. T. A. Thorson, Vice President, describes the firm's growth rate since adding aerosol to its line 30 months ago as "outstanding." For the first year and a half the company used a custom aerosol packer. Then it bought its own manually operated aerosol equipment "of the laboratory equipment type," says Mr. Thorson. The firm continued to use a custom packer for big runs, and its own line for testing and shorter runs. Now it will be equipped to do all its own packaging, and perhaps have some capacity available for serving other manufacturers in its area. The custom packager it had been using is located 800 miles away.

The new line is a completely engineered Kartridg Pak 800 series straight line consisting of an electromatic filler, a purging unit, a crimper, a pressure filler, a pressure tester and water bath. It will be used for filling paints, varnishes, insecticides, lubricants, and related items.

Pressurized Packaging (Aerosols) by A. Herzka & J. Pickthall. 1958, London. Butterworths Scientific Publications 411 pp. $12. (U.S.A. Edition by Academic Press Inc., 111 Fifth Ave., N. Y. 3, N. Y.)

This book is the first, and at present, the only comprehensive review of aerosol technology.

The authors, A. Herzka is in charge of aerosol development for the Metal Box Company (Ltd.), and J. Pickthall is Chief Research Chemist at Polak & Schwarz (England) Ltd. The latter in addition to his specialization in aerosols is well known in the United States and England in the fields of perfumery and cosmetics. Both authors have traveled in or written about the aerosol industry in the U. S. for a number of years.

To repeat that cliche' of book reviewers we can honestly say that their book should be in the library or at the desk of everyone involved in aerosol formulation, testing or packaging. The authors are to be congratulated on their courage and energy with which they have endeavored to survey fully an industry developing so rapidly on so many fronts as aerosols.

All aspects of aerosol technology are covered utilizing the full U. S. literature where the industry began and has shown its fullest development. Of most interest to the paint industry are chapters on the history and principles of aerosol packaging, propellants, valves, containers, filling techniques and laboratory evaluation procedures. Chapters on formulation on all segments, from foods to fire extinguishers are treated, including paints and varnishes and paint removers. The appendix includes a glossary of Terms, Trade Names, British Patents as well as an interesting "World Directory of Suppliers." The aerosol industry is truly worldwide.

The chapter on propellants is perhaps the best and most comprehensive in the book. Here under one cover are reproduced the technical data, curves, tables and critical constants which have previously been scattered throughout suppliers literature or technical papers. The liquified gas propellants, the fluoro-hydrocarbons and mixtures thereof are listed with full data as

well as their various trade names used throughout the world. Of particular value to the paint industry are the Kauri-butanol values of these propellants as well as solubility data on a full range of organic compounds.

Data on chlorinated propellants as vinyl chloride (little used in the U. S.) and methylene chloride (widely used) as well as chlorothene are given. These materials must be used with caution and forethought in aerosols and it is good to have their critical data well at hand. The paraffin hydrocarbons such as propane, the butanes, pentanes, and hexane are fully treated. In view of the controversy over the use of these latter propellants in the U. S. the following quotation from the book is of interest:

"They would be used to a much greater extent and might even have replaced the fluorohydrocarbons completely were it not for their flammability characteristics. Their use in this country and the U.S.A. is therefore restricted to two spheres. They are used either to provide the propellant force in three-phase systems or to replace a portion of the conventional propellants in order to lower the cost of the pack."

The compressed gases, the soluble Nitrous oxide and Carbon dioxide as well as the generally insoluble and inert nitrogen are treated in detail.

"Dispenser Components," that is, containers, aluminum, blackplate, glass, plastic and tinplate as well as valves and protective covers are described and diagrammed in detail.

Filling techniques and equipment, both pressure and cold methods, are outlined and photographed. Of the laboratory evaluation methods the most interest to the paint industry are compatability tests, spray patterns, discharge rates, particle size analysis, inflamability tests, solid content of pressurized coatings. All of these methods are currently in use in the U. S., in fact were mostly developed here.

In the product formulation sections the chapter on paint and varnishes are far from the best in the book. The full available literature on paints in the U. S. is not utilized. However, a good number of formulae of touch-up lacquers based upon British practices are given.

In the chapter on paint removers the authors define paint removers as follows: "A paint remover is a blend of solvents selected so that the mixture will be capable of softening both alkyd and lacquer finishes to the point where they can be removed easily by scraping or wiping. Additives that retard evaporation and prolong the action of the solvents are also included in this type of formulation."

Since the majority of paint removers contain methylene chloride careful selection of both the valve and container is necessary. Also, to avoid corrosion, the moisture content of the pack must be kept at a minimum. To increase the effectiveness of methylene chloride formulations which are not too good for nitro-cellulose removal, glyco ethers, esters, ketones and alcohols are added. The peculiar solvent balance required for paint removers plus other additives as waxes offers a real challenge to the formulator to avoid thickening and settling.

The advantages of aerosol paint removers over application by a brush given by the authors are: (1) "Pressurized dispensing is much easier and cleaner.

LOW-COST TUNG OIL* MAKES SUBSTITUTES IN VARNISH FORMULATIONS UNECONOMIC, UNNECESSARY

When formulating varnish don't continue to sacrifice TUNG OIL quality . . . or put up with annoying handling problems and long, costly cooking cycles.

Change to TUNG OIL formulations that require less handling, shorter cooking time. Use preferred TUNG OIL, which, when properly formulated, puts every superior characteristic into your varnishes . . . high, hard, impact-resistant gloss . . . fast, complete drying without aftertack . . . and exceptional resistance to grease, weather, water, abrasion and alkali.

Compare costs . . . compare results . . . and see for yourself why varnish formulations without TUNG OIL are uneconomic and unnecessary.

* Tung Oil, produced in the Americas in ample supply to meet all domestic needs, averaged 22c per pound in price during 1959, and fluctuated less than 1¾c per pound throughout the year. For complete price protection, yearly contracts are available. Immediate shipment.

Write for information on formulating varnishes with TUNG OIL . . . for superior product...improved customer relations...and increased prestige of your brand name.

THE NATIONAL TUNG OIL MARKETING COOPERATIVE, INC.

205 CUMEERI AND STREET • FOPLARVILLE, MISSISSIPPI

Sales Agents for the bulk of Tung Oil produced in the U. S. A.

(2) Less paint remover is required.
(3) The activity of the remover appears to be increased by the type of deposit formed. The characteristic very 'slushy' snow-like deposit tends to hold the solvents in contact with the paint or varnish better than that from the brush application.
(4) Varnish is removed appreciably more easily. This is particularly evident with a formulation producing a heavy tenacious, snow-like deposit. Varnish softened by the aerosol method can be easily and cleanly scraped off with a putty knife because the softened varnish tends to adhere to the deposit. In contrast, varnish softened by brush-on remover becomes very fluid and is then very difficult to scrape off. This difference results in an improved efficiency of such magnitude that one application of pressurized paint remover is equivalent to two or more brush applications."

For those who have seen the aerosol industry grow piecemeal from nothing, it is very satisfying to see the various segments of the industry gathered together and described in one volume. American aerosol authorities should be somewhat chagrin that while the major developments have taken place in the U. S., the English have beat us to a good reference book on aerosols by at least by two years. It would appear that the experts here have been too busy and too close to its breathtaking growth to stop and document the aerosol industry.

We heartily recommend the Herzka & Pickthall book to both veterans and newcomers to the industry.

Plasti-Kote Reports Sales Up 38 Per Cent in 1959

Plasti-Kote, Inc., aerosol paint manufacturer, has reported a 38 per cent sales volume increase in 1959 over 1958.

According to Elias Shapiro, Executive Vice President, in a report to the Plasti-Kote sales representatives, "I personally believe that we are only on the threshold of what promises to be another record breaking performance in sales growth. We expect to do much better in 1960 and our goal will be a 40 per cent increase over our sales volume for 1959.

"Now, these percentages do not come out of the air, nor is it wishful thinking on my part. The whole industry growth guarantees that for those companies who have logical sales programs and aggressive, qualified and capable sales organizations, this increase is well within reach and, therefore, the rewards will be great," he said.

Mr. Shapiro also said, "We are fortunate in being part of an industry that is just starting its growth potential. Based on facts and figures that have been presented to us by careful surveys, there are only four out of ten people who are aware of the fact that paint is available in spray form.

"Therefore, there is no question about the size of the market nor of ever reaching a saturation point. The question again becomes, 'Will we take advantage and be in position to enjoy this continual growth?'

"It is my opinion that we now have reached the point in the history of our industry which will require greater knowledge, more study and a sounder position as marketers in this industry. What we have accomplished thus far we can be proud of, but it should be the stepping stone to our preparation to share in future benefits," he concluded.

METASOL 57 is an easy-to-handle, dust-free, specially prepared phenylmercury propionate powder which can be used in all systems – oil or water. Unlike other phenylmercurials, METASOL 57 disperses rapidly and effectively throughout both the water and the oil phase.

In oil systems, METASOL 57 gives full mildew protection at savings of 25% or more. It stays active – will not leach out or lose its effectiveness in the dry paint film.

In aqueous systems, METASOL 57 provides greater assurance in use. It contains no solubilizing agents to affect emulsion stability. It will not cause pigment flocculation.

Write today for the full story.

METASOL products for the paint industry.

METASOL 57	METASOL 30	METASOL 0	METASOL BT
the preferred mildewcide – preservative for both water and oil systems.	30% phenylmercuric acetate in aqueous solution.	30% phenylmercuric oleate in varnish makers' naptha.	phenylmercuric borate powder.

METASOL DIVISION METALSALTS CORPORATION
200 WAGARAW RD. • HAWTHORNE, N.J.

BLISTER BOX

(*From page 37*)

of exposure, about the firm's vinyl acetate copolymers and other films. In the first tests, standard asbestos cement panels were mounted for testing paint films over masonry, and various kinds of wood panels for performance of emulsion paints and primers on wood. A total of 72 panels were required to close in the building. Temperature was kept at 70-75 degrees F. and humidity at 75%.

The house cost about $3000. Measuring 6′ by 12′, it is set on 8 x 8 creosoted wood posts on the flat roof of an existing building. Resting on these posts are 8 x 8 creosoted beams, to which the framing is bolted. The floor of the house is 2″ wood planking.

The side framing is made of aluminum angles measuring 3 x 2 x ¼, with corner posts 4 x 4 x ¼. Aluminum channels 1¼ x 1¼ x 1/8 circle the fram top and bottom to receive the test panels, which are bedded in caulking compound in the channels. The roof is corrugated transite board. A door at one end provides access to the house.

The interior of the house contains a unit heater of 30,000 BTU/hr. capacity, a steam humidifier which supplies 5 lbs./hr. of steam at 2 lbs./sq. in. pressure, with humidistat to automatically maintain humidity at constant level; a circulating fan of 3-400 cfm. which keeps the entire space at uniform humidity and temperature; and a portable relative humidity and temperature recorder.

End view of blister house shows panels ready for mounting, and piping for steam and heat inside.

Inside of blister house shows welded aluminum framing, test panels with taped joints, unit heater at ceiling, steam jet and humidistat at center (white cloud at center is vapor) and floor fan which circulates heat and vapor.

SUN-TESTED
VELVA-GLO®
FLUORESCENT PIGMENTS
...give you a *breakthrough in color* for product development. Nothing else approaches Velva-Glo for capturing and holding attention.
Eight exciting new colors: blue, cerise, chartreuse, red, orange-yellow, orange-red, orange, pink—for your paints, inks, plastics, latices, and coatings. Write today for free samples of pigments and Technical Bulletin No. 59.
RADIANT COLOR COMPANY
830 Isabella St., Oakland 7, California
461 W. Erie St., Chicago 10, Ill. • 249 W. 29th St., New York 1, N. Y.
Manufacturers of Velva-Glo fluorescent pigments, paints, papers, cardboards, fabrics
18

PHOTOVOLT
Photoelectric GLOSSMETER

For reliable gloss measurements according to ASTM D523-53T on

Paints, Varnishes and Lacquers

Also for

- **Tristimulus Colorimetry with 3 Filters**
- **Sheen Measurements at 85 Degree Incidence**
- **Dry Hiding Power and Infra-Red Reflectance**

in accordance with Federal Specifications TT-P-141c

Portable, rugged, simple to operate

Write for Bulletin #677 to

PHOTOVOLT CORP.

95 Madison Avenue New York 16, N. Y.

Florida Vacation

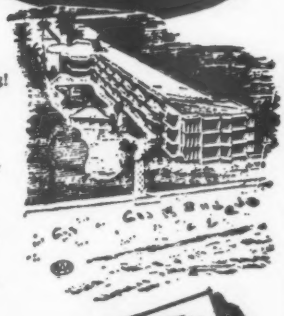
the New!

LAUDERDALE RUTTGER

RESORT-O-TEL

DIRECTLY ON THE OCEAN

FORT LAUDERDALE



with TWO leisure styles of vacation living!

★ COMPLETE HOTEL SERVICES AND STAFF, or

★ THRIFTY "DO-IT-YOURSELF" MOTEL UNITS

Double rooms, efficiencies, suites, many with private balconies.

★ PRIVATE BEACH

★ HEATED, FRESH-WATER POOL

★ ELEVATOR ★ SHUFFLEBOARD

★ PUTTING GREEN

Poolside Pagoda Bar, Sai Wen Lounge, Far East Dining Room.

Owner-Management assures personal friendly service

For full color brochure, rates, see your travel agent, or write

LAUDERDALE RUTTGER

RESORT-O-TEL

On the Famed Galt Ocean Mile, Fort Lauderdale, Florida

Affiliated with Ruttger Resorts in Florida and Minnesota

Dianol is certified by U.S. Testing Corporation.

..for added Selling Power

Dianol is available to paint manufacturers in 50-pound, triple-lined, waterproof bags.

Your Paint with . . .

DIANOL Paint Insecticide

Kills All Household Insects

Now you can add complete insect extermination to your paint with Dianol Paint Insecticide. It mixes during manufacture with any type paint regardless of base. Guaranteed effective, Dianol is thoroughly tested and proven. It will not affect in any way the quality of your paint.

Your Paint with . . .

DIANOL Anti-Mildew Compound

Gives Guaranteed Mildew Protection

Put your paint out in front with Dianol Anti-Mildew Compound for Paint. It offers great competitive advantage . . . complete and lasting mildew protection. Your paint with Dianol has new dimensions that preserve the lasting beauty of your paint. Mix during manufacture; no harmful ingredients, no mercury compounds.

For full processing facts and other Dianol information, WRITE now for the new booklet prepared especially for paint manufacturers.

DIANOL

Dianol Division, Mills-Pearsen Corporation

Department PV-6
P. O. Box 10968
St. Petersburg, Florida

We invite inquiries from resident agents in foreign countries.

WATER GROUND
MICA
ALSIBRONZ
EXTENDER PIGMENTS
for:
PRIMER-SEALERS
HOUSE PAINTS
LATEX-EMULSIONS
FRANKLIN MINERAL PRODUCTS
COMPANY
FRANKLIN, NORTH CAROLINA
INCORPORATED 1926
Agents in Principal Cities

NEW!
DERMITRON
NON-DESTRUCTIVE
COATING THICKNESS
TESTER

Measures coatings rapidly and accurately.
Instantly measures the thickness of coatings and films such as PAINT, ENAMEL, VARNISH, PRIMER, LACQUER and all other organic and industrial finishes on ALUMINUM, BRASS, COPPER, ZINC, MAGNESIUM and all other metals.
Write for complete information.
UNIT PROCESS ASSEMBLIES, INC.
UPA
53-15 37th Ave., Woodside 77, N.Y.

THICKNESS TESTER

(*From page 39*)

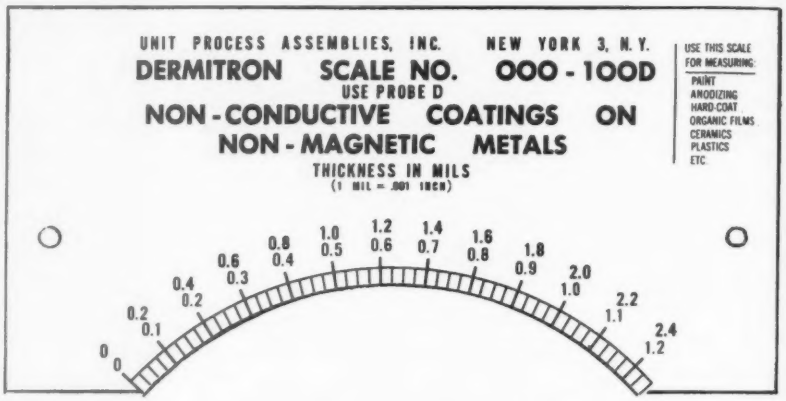


Figure 2. Direct-reading scale.

Since the instrument operates by virtue of differences in electrical conductivity between the coating and the base metal, the same calibration applies to the measurement of all non-conductive coatings on a particular metal. In other words, this tester will not distinguish between various paints, primers, enamels, lacquers, etc. so that variations in the composition of these coatings will not affect the calibration or the accuracy of the instrument. When measuring these coatings, this instrument is actually measuring only the distance that the tip of the probe is being held away from the base metal, by the thickness of the coating.

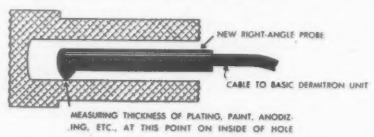
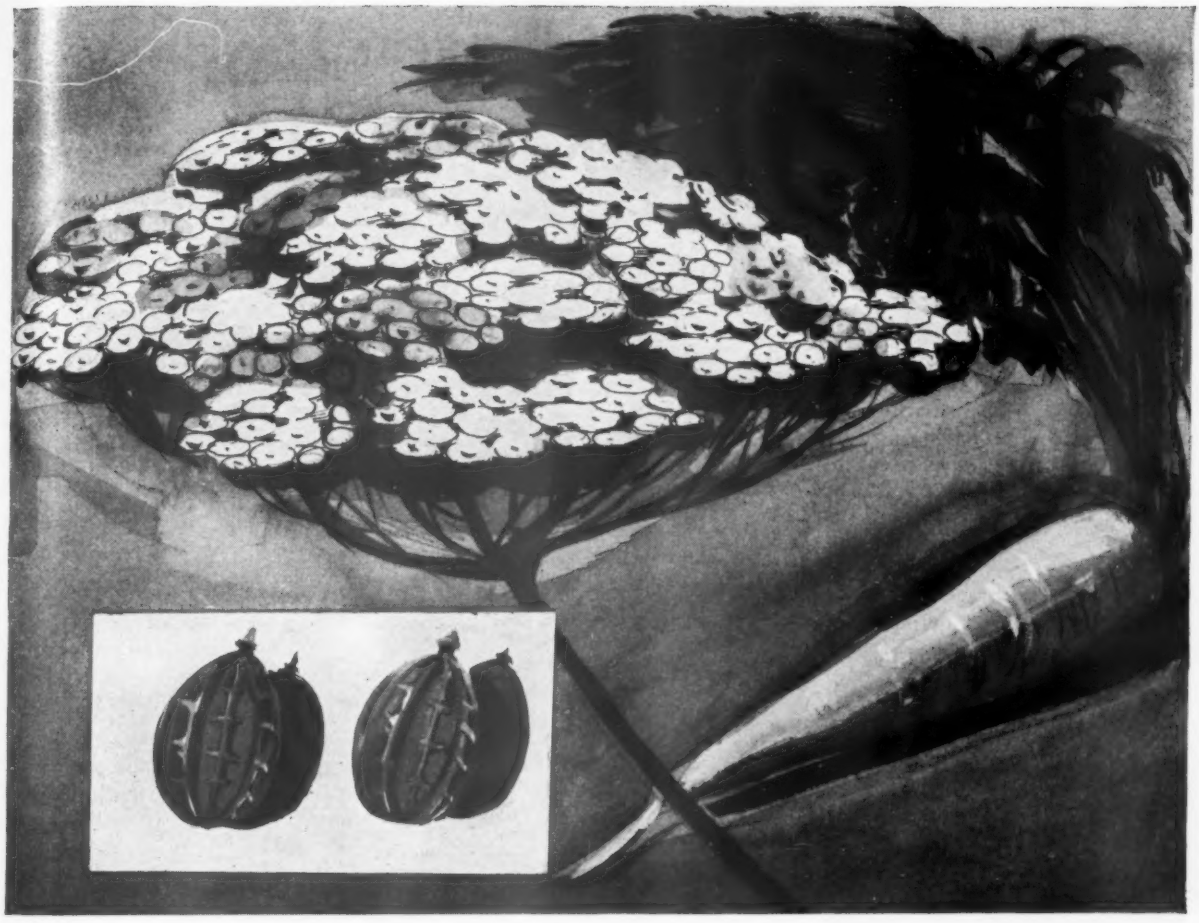

NEW RIGHT-ANGLE PROBE
CABLE TO BASIC DERMITRON UNIT
MEASURING THICKNESS OF PLATING, PAINT, ANODIZING, ETC., AT THIS POINT ON INSIDE OF HOLE

Figure 3. Diagramatic representation of right-angle probe making internal measurement.

During the past several years, this thickness tester has been widely applied to the measurement of paints and enamels on aluminum sheet, aluminum and magnesium castings (regardless of alloy), zinc die-castings, etc. Figure 4 shows the instrument being used at Rolls-Royce of Canada measuring thickness of paint and phenolic resin on aluminum impellers of their turbo-prop engines. Many paint manufacturers are using the Dermitron in testing paint thickness on various metals.

Figure 4. Rolls-Royce of Canada uses Dermitron for measuring thickness of paint on aluminum impellers of turbo-prop engines.



They're both seeds, but...

each is in a class by itself . . . like Wyandotte's PURECAL® O

You can't tell them apart at a glance . . . but the fact is, one of those seeds will produce the weed known as Queen Anne's lace, and the other its refined descendant, the most flavorful of carrots.

There are important differences in calcium carbonates, too. Wyandotte PURECAL O is in a class by itself! You see, Wyandotte's double refining — a unique reaction process — yields precipitated calcium carbonates that exceed U.S.P. purity standards. Particles, 0.15 micron in size, are agglomerate-free, and consistently cubical in shape. Whiteness and dry-hiding power are *exceptional.*

PURECAL O particles offer excellent hiding power. You can extend your prime pigments (such as TiO_2) in this way: first replace part, or all, of your "less-bright" fillers with PURECAL O . . . then replace the pigment with PURECAL O in 10% increments until the optimum or desired whiteness is reached. Result: You get a better quality paint at your present cost level, or you cut costs without sacrificing quality.

Only by trying PURECAL O in your formulation can you appreciate its merits. Write for samples and data, today. *Wyandotte Chemicals Corporation, Dept. 757-P, Wyandotte, Michigan. Offices in principal cities.*

Wyandotte CHEMICALS

MICHIGAN ALKALI DIVISION

PACING PROGRESS WITH CREATIVE CHEMISTRY

Henry F. Payne Chosen to Give Annual Mattiello Memorial Lecture

HENRY F. Payne, Professor in Charge of Organic Coating Research and Technology at the University of Florida, Gainesville, Fla., has been selected to present the Annual Joseph J. Mattiello Memorial Lecture at the 38th Annual Meeting of the Federation of Societies for Paint Technology which will be held at the Hotel Sherman in Chicago, Ill. from October 31 through November 2.

The subject of his lecture will be *The Philosophy of Coatings.*

Henry F. Payne

The Mattiello Lecture, instituted by the Federation in 1949, commemorates the name of Dr. Joseph J. Mattiello, who, as a member of the Federation, did so much to expand the application of the science in the protective coatings field. Professor Payne is the twelfth outstanding scientist to receive one of the paint industry's highest honors—selection as a Mattiello Lecturer. Previous Lecturers were: Roy H. Kienle (1949); Theodore F. Bradley (1950); Donald H. Wheeler (1951); John R. MacGregor (1952); Adolf C. Elm (1953); James S. Long (1954); Herman F. Mark (1955); Maurice Van Loo (1956); Albert C. Zettlemoyer (1957); Eugene G. Rochow (1958); and Vincent C. Vesce (1959).

Professor Payne has had a wide range of experience in the paint industry and has been associated with the University of Florida for the past five years.

He was born near Bristol, England on December 9, 1895 and his family moved to Vancouver, B.C., Canada in 1907. In 1920 he entered Pratt Institute in Brooklyn, N. Y. and was graduated in 1922 from the School of Industrial Chemical Engineering. He was awarded the Pratt Alumni Gold Medal in 1923 for excellence in his studies and for having obtained the position of Chief Chemist with John L. Armitage & Co., Newark, N. J. who produced a wide range of architectural and industrial paints and lacquers.

Early in 1937 he obtained a position as Development Chemist with the United Color and Pigment Co., Newark, N. J. In November 1937 he was employed as Group Leader in charge of resin evaluation in the Stamford Laboratories of the American Cyanamid Co., Stamford, Conn. He was transferred to the New York office of American Cyanamid in 1944 to participate in sales promotion and technical writing. He was Editor of the Cyanamid publication known as *For Instance* for some years. In 1955 he retired from the American Cyanamid Co. to accept his present position.

Professor Payne was graduated from the Evening School of Polytechnic Institute of Brooklyn with the Bachelor of Chemical Engineering Degree in 1937. He was awarded the Henry Raymond Prize for the best thesis in the College of Engineering and was elected to Tau Beta Pi. He continued his studies in the Graduate Evening School of the Polytechnic and earned the Master of Science Degree in Chemistry in 1940 and was elected to Phi Lambda Upsilon. From 1945 to 1955 he was Adjunct Professor, in the Graduate Evening School of the Polytechnic in charge of research and teaching in organic coatings.

Professor Payne has had many publications in the scientific and trade journals. His first paper appeared in the *Official Digest*, October 1936, on the subject of *Permeability and Structure of Films.* In a series of papers on this subject which appeared in *Industrial and Engineering Chemistry* he showed the relationship between composition and structure of a variety of coatings by measuring their permeability to the vapors of several organic liquids in addition to water.

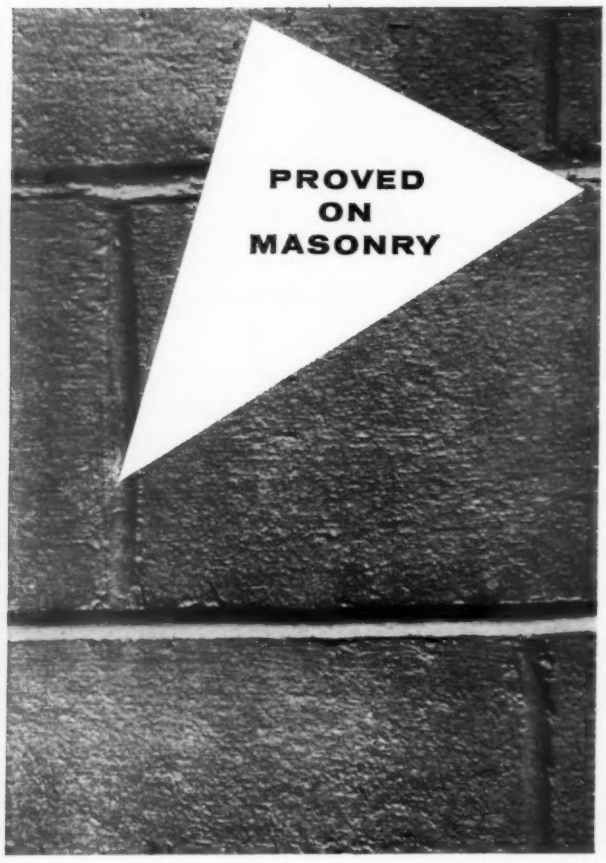
One result of this work was the commercial production of the Payne Permeability Cup which is described in a Federation Standard Method of Test.

He worked with ASTM Committee D1 on methods for producing coatings of uniform thickness for test panels and developed the automatic dipping apparatus known as the Fisher-Payne Dip-Coater. The method is described in ASTM Designation: D823-53, in *Industrial and Engineering Chemistry*, Anal. Ed. Vol. 15,48 (1943), and in the *Official Digest*, Sept., 1944.

Professor Payne contributed Chapter 7 in Vol. IV, of *Protective and Decorative Coatings* by J. J. Mattiello, and two sections on coatings in the *Encyclopedia of Chemical Technology* by Kirk and Othmer. He also wrote the section on "Organic Finishing Materials" in the *Handbook of Engineering Materials* by Miner and Seastone. In 1954 John Wiley and Sons published his Volume 1, *Organic Coating Technology* which discusses the chemistry, manufacture, and use of the oils, resins, and polymers used in coatings. Volume 2 of this two-volume set discusses pigments and pigmented coatings, and it will be available about October 1.

News about

B.F.Goodrich Chemical *raw materials*



How Geon vinyl chloride-acrylic latex produces outstanding paint formulations

Here are two examples of paint formulations using Geon 450X3, a vinyl chloride-acrylic copolymer. The house at left was painted 3½ years ago. The building at right was painted four years ago. These two formulations made from a single Geon base demonstrate manufacturing advantages and on-the-surface results like this:

- **simplified paint manufacture because binder is internally plasticized**
- **excellent stability and uniformity**
- **excellent adhesion to wood and masonry**
- **exceptional durability and weatherability**
- **tough, flexible tack-free films with outstanding pigment binding ability**
- **waterproof to exterior penetration, yet permits escape of interior moisture**

Get more information about the excellent performance and versatility of this unique Geon copolymer. Or learn more about how Geon can help you in other ways to improve products and open new markets. Write for the new Booklet telling about use of Geon in paint formulations. Dept. GP-4, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

A TRADE MARK OF B.F.GOODRICH CHEMICAL COMPANY
Geon
VINYLS
A DIVISION OF THE B.F.GOODRICH COMPANY

B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

B.F.Goodrich

GEON vinyls • HYCAR rubber and latex • GOOD-RITE chemicals and plasticizers

New Union Carbide Lab Aids Customer Service

UNION Carbide Chemicals Company is now operating its new Technical Service Laboratory in Westchester (Tarrytown), New York. The new Laboratory is designed to aid in the development and improvement of the products of Carbide's customers.

This new facility centralizes and expands Carbide's customer service and use-research that, since 1925, had been carried out principally at Mellon Institute in Pittsburgh but also in several other areas including South Charleston, W. Va.; Whiting, Indiana; and affiliated company laboratories at Bound Brook, N. J.; Tonawanda, N. Y.; and Millwood, N. Y.

H. D. Cogan

Rapidly changing technology and marketing methods mean that a chemical salesman must offer more than a good product. This is the whole purpose of this new technical service laboratory.

"An increased service effort is required to support sales of chemicals in areas undergoing rapid or significant changes," Mr. J. A. Field, Vice President—Marketing, told guests at the recent opening of these laboratories. "Customers are wary of changing their formulations, more so than several years ago, and as suppliers, we must be responsive to the needs of our customers."

The scope of activities in this modern facility is broad and varied to provide the information needed for the company's more than 400 synthetic organic chemicals and the many end uses into which they go.

One of the major industry groups Union Carbide serves is the coatings field. Of the 400 chemicals UCC produces, many find their way into a variety of paints, lacquers, varnishes, and other coating materials. These include solvents, plasticizers, water-soluble chemicals, detergents, silicones, propellents, intermediates, monomers, etc.

One of the biggest outlets for monomers has been in the field of latex paints. The three main latexes used in water-emulsion paints today are acrylics, polyvinyl acetate and styrene-butadiene. It is estimated that of the 70 million gallons

Dr. Malcolm Ver Nooy

of latex paints produced in 1959, acrylics accounted for 8 million gallons of the latex produced, polyvinyl acetate for 22 million gallons and styrene-butadiene for 40 million gallongs.

This growth in latex paint sales takes on added significance in view of the introduction of water emulsion paints for exterior wood applications this year. Exterior wood painting represents an annual market of 50 million gallons of paint. Eager to share in this volume, latex producers are vigorously engaged in developing specialized emulsions designed for exterior use. Presently both acrylics and vinyl acetate copolymer emulsions have been used successfully in exterior wood formulation.

One monomer which has shown considerable promise in such formulations has been 2-ethylhexyl acrylate as a comonomer with vinyl acetate pioneered by Union Carbide Chemicals several years ago. Work continuing on at UCC Technical Service Laboratory concerns the use of acrylic esters in various copolymer latexes. According to H. D. Cogan, Research Supervisor, the trend in the past few years has been more and more toward the use of copolymers rather than the use of externally plasticized homopolymers for vinyl acetate type emulsions. Acrylic esters have been particularly attractive because of their availability, ease of polymerization and efficiency in modifying the polymer.

In this connection, Mr. Cogan mentioned that the higher methacrylic esters have not been investigated in this particular application primarily because of their high price.

Regarding vinyl esters, Mr. Cogan feels that most of these have been investigated fully here in the United States with the exception of vinyl propionate which has evoked some interest in Europe.

With exterior latex paints for wood making their debut this year, Union Carbide looks for increased sales of its acrylic esters for producing emulsion with such properties as good color retention, good adhesion to wood (wet and dry), non-blistering, weatherability and high durability.

Dr. Malcolm VerNooy, a product manager in Union Carbide Chemicals Company's New Chemical Division feels that straight acrylics and styrene-acrylic systems have much to offer in exterior wood formulations. From an overall performance standpoint, both are good and have been accepted by latex paint manufacturers.

One of the drawbacks of exterior latex paints now being marketed is the recommendation by the manufacturer that an oil primer be used in order to get best results. Naturally this takes the glamour out of the water-thinned products. Dr. VerNooy feels that a latex primer is needed, or better, a self priming product in which two coats can be obtained with the one package.

For applications on metal, Dr. VerNooy mentioned glycidyl acrylate which can be used as a cross linker with acrylic or styrene-acrylic type latexes. Such a system requires only a mild baking cycle to achieve final film hardness and gloss.

At this new laboratory, Carbide scientists also prepare coatings to evaluate formulations in terms of viscosity, spray characteristics flow-out properties, evaporation rates, dilution ratios, blush resistance, costs and other important characteristics.

A SKILLED HAND IN CHEMISTRY...AT WORK FOR YOU

METASAP*

thickener-A

A bodying agent with minimum effect on gloss

Compound Metasap Thickener-A with interior and exterior paints, enamels, primers, caulking compounds and other fluid, organic systems. You will find that coating formulations bodied with this thickener remain at a constant viscosity over long periods of shelf storage. In addition, because it is highly thixotropic, Metasap Thickener-A produces these desirable effects:

- Assists pigment suspension
- Inhibits penetration into porous surfaces
- Imparts antisagging properties
- Improves brushability
- Helps prevent orange peel

Metasap manufactures a full line of paint specialties and has the technical resources to help you solve any formulating problem. Write for full information.

NOPCO®

METASAP Division

NOPCO CHEMICAL COMPANY

60 Park Place, Newark, N.J.

*Trademark of Nopco Chemical Company

Plants: Harrison, N.J. • Richmond, Calif. • Cedartown, Ga. • London, Canada

NEWS

NEWS OF COMPANIES, ASSOCIATIONS
TECHNICAL GROUPS
ITEMS OF GENERAL INTEREST

Receiving advice and encouragement from below, Donald D. Pascal (top right), president of National Starch and Chemical Corp. mans the controls of digging machine during recent groundbreaking at the company's Alexander Laboratories, Plainfield, N. J. Two additional buildings to be completed there by early next year will increase National's East Coast research and technical development facilities by more than fifty per cent. Company officials shown participating in ceremonies are [(left to right): Eugene Shloss, head of engineering; Dr. W. Vincent Upton, laboratories administrator; Dr. Carlyle G. Caldwell, research director; Mr. Pascal.

George W. West, of Atlanta, Ga., Chairman of the National Construction Industry Conference held in Washington March 10-11, discusses the program with William E. Hood, President of the Industrial Paint Manufacturing Co., of Birmingham, Ala. (left) and Dr. Gustave Klinkenstein, President of Maas & Waldstein Co., of Newark, N. J. Mr. Hood and Dr. Klinkenstein—both members of the National Paint, Varnish & Lacquers Assn.—received "Certificates of Merit" at the conference for their "outstanding contributions to the construction industry and to the advancement of the free enterprise system." The two-day conference was sponsored by the Chamber of Commerce of the United States to give the more than 250 industry leaders in attendance an insight into the problems and opportunities of the 60's.

Sinclair and Koppers Plan Petrochemical Plant

Sinclair Oil Corp. and Koppers Company, Inc., jointly announced plans to build a large modern petrochemical plant to be located at Houston, Texas.

The new plant will produce styrene monomer, a basic chemical used in the manufacture of plastics, synthetic rubber, latex and other products.

According to the announcement, a new jointly-owned corporation will be formed to own and operate the plant.

Construction of this new facility will begin immediately. Completion and initial operation is expected by the middle of 1961.

Sinclair Refining Co., an operating subsidiary of Sinclair Oil Corp., will supply the raw material for the new company and Koppers will use or market the styrene output of the plant, estimated to be 70 million pounds per year. The facility will separate ethylbenzene from an aromatic stream produced at Sinclair's Houston refinery. The ethylbenzene is then converted to styrene monomer by dehydrogenation.

This new facility will take advantage of Sinclair's raw material supply and Koppers' established position in the growing market for styrene products. Koppers has been producing and marketing styrene products since 1946 and produces many types of styrene plastics having a wide range of application.

Theodore Shapiro Retires

The retirement of Theodore Shapiro has been announced by Dutch Masters Paint and Varnish Co. Mr. Shapiro and the late Nathan Pashman founded the company in 1920 as manufacturers of paints, enamels, varnishes and allied specialties.

The company plans a testimonial dinner to Mr. Shapiro, who now intends to devote his entire time to philanthropic organizations which he has served in the past.

Management of the Dutch Masters Paint and Varnish Company has been assumed by Howard B. Pashman and Julius E. Lieb, who will now guide the company's future.

NEWS

Benjamin Farber

Benjamin Farber Elected President of NYPVLA

Benjamin Farber, newly elected president of the New York Paint, Varnish, and Lacquer Association, brings to his new office many years of experience in the Paint Industry.

He was one of the principals in the organization of Farnow in September, 1938. It was then called Farnow Varnish Works. During the years, the company grew in size. In 1954 the firm became Farnow, Inc. and Benjamin Farber was elected president, a position he holds to the present day.

He has contributed many articles on paint and varnish technology and has lectured before groups at various colleges. He has also been engaged in many philanthropic activities.

Benjamin Farber also belongs to The American Chemical Society, The Society for Paint Technology, Queens Chamber of Commerce, and the Chemists Club.

William C. Dunlap Dies

William C. Dunlap, Manager of Purchasing of The New Jersey Zinc Co., died on February 18th.

Mr. Dunlap was born in Harrisburg, Pennsylvania and after graduation from Princeton University, joined The New Jersey Zinc Company in 1915 as a civil engineer in the Purchasing Department.

General Joseph F. Battley (left), President of the National Paint, Varnish and Lacquer Assn., accepted for the Association a Certificate of Recognition presented by U. S. Housing Administrator Norman P. Mason for "outstanding service and assistance to the Housing and Home Finance Agency in orientation and training of foreign visitors under programs of the United States Government and international organizations."

Zinc Institute Elects Officers and Directors

The American Zinc Institute re-elected its entire slate of officers to serve for another year—as president, R. G. Kenly, vice president, The New Jersey Zinc Co., New York City—as vice presidents, T. A. Campbell, Anaconda Sales Co., New York City; H. D. Carus, Matthiessen & Hegeler Zinc Co., La Salle, Ill.; E. H. Snyder, Combined Metals Reduction Co., Salt Lake City—as treasurer, G. H. LeFevre, U. S. Smelting Refining and Mining Co., New York City—as executive vice president and secretary, J. L. Kimberley, N. Y.

Directors elected for the term expiring 1963 are T. A. Campbell, Anaconda Sales Co., New York City; A. C. Eide, American Zinc, Lead & Smelting Co., New York City; S. S. Goodwin, The New Jersey Zinc Co., New York City; T. K. Graham, The Anaconda Co., New York City; H. E. Lee, The Bunker Hill Co., San Francisco, Calif.; G. W. Potter, Potter-Sims Mines, Inc., Joplin, Mo.; E. A. Torney, The Bunker Hill Co., San Francisco, Calif.; H. I. Young, American Zinc, Lead & Smelting Co., St. Louis, Mo.; and M. M. Zoller, The Eagle-Picher Co., Cincinnati, Ohio.

June 26-July 1. Annual Meeting of American Society of Testing Materials, Atlantic City, N. J.

August 8-12. Gordon Research Conferences, Organic Coatings, Colby Junior College, New London, N. H.

August 22-23. Annual Joint Conference of American Soybean Assn. and National Soybean Processors Assn., Hotel Peabody, Memphis, Tenn.

PRODUCTION CLUBS

Baltimore, 2nd Friday, Park Plaza Hotel.

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Hotel Alms.
Dayton — Nov., Feb., April, Suttmilers.
Columbus — Jan., June, Sept., Fort Hayes Hotel.

Cleveland, 3rd Friday, Cleveland Engineering & Scientific Center.

Dallas, 1st Thursday after 2nd Monday, Melrose Hotel.

Detroit, 4th Tuesday, Rackham Building.

Golden Gate, 3rd Monday, Sabella's Restaurant, San Francisco.

Houston, Monday prior 2nd Tuesday, Rams Club.

Kansas City, 2nd Thursday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

Montreal, 1st Wednesday, Queen's Hotel.

New England, 3rd Thursday, University Club, Boston.

New York, 1st Thursday, Brass Rail, 100 Park Ave.

North Carolina, 3rd Wednesday, Rainbow Supper Club, High Point.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, 3rd Thursday, Washington Athletic Club, Seattle, Wash.

Philadelphia, 3rd Wednesday, Philadelphia Rifle Club.

Pittsburgh, 1st Monday, Gateway Plaza, Bldg. 2.

Rocky Mountain, 2nd Monday, Republican Club, Denver, Colo.

St. Louis, 3rd Tuesday, Kings-Way Hotel.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Oak Room, Union Station.

Western New York, 1st Monday, 40-8 Club, Buffalo.

PERSONNEL CHANGES

MILTON CAN

Andrew S. Applegate has been named to the sales staff. Mr. Applegate will bring to the company 14 years experience in the paint industry. Mr. Applegate was formerly with Naftone, Inc. for whom he covered New York State and midwestern areas.

A. S. Applegate

F. W. Morgart

ANTARA CHEMICALS

Frederick W. Morgart, Jr., has been named Sales Engineer in charge of field Sales in the Minneapolis, Minn. area.

DESOTO CHEMICAL

Leslie E. Thompson has been named to the newly created position of Manager of Paint and Resin Operations. In his new assignment, at the company's executive offices in Chicago, Mr. Thompson will be responsible for coordinating the operations of the firm's six paint and resin plants. His activities will include production, purchasing, engineering and planning.

L. E. Thompson

L. E. Franklin

AIRCO

Lloyd E. Franklin, Jr., has been named sales and development representative.

Mr. Franklin will handle the firm's sales and service in the southeastern states of North Carolina, South Carolina, Georgia, Alabama, Florida and eastern Tennessee. He will call on accounts in the textile and chemical processing industries.

KOHNSTAMM

Andrew J. Torter has been named assistant sales manager of the color and flavor divisions.

Mr. Torter has been associated with the company since 1929, and has served in sales capacities during recent years.

A. J. Torter

R. W. Held

TAMMS

Russell M. Held has been named Vice President and General Sales Manager.

SHELL DEVELOPMENT

Reed Bell has been named as a research supervisor at the firm's Emeryville, Calif. research center. He will head a group engaged in research on polymer synthesis.

CARGILL

James R. Cargill, assistant vice president of the research and product development division, has been named manager of its industrial products and technical oils operation.

Need Filter Materials

NOW!

"FILPACO"

stocks most items for

IMMEDIATE DELIVERY!

"FILPACO" is the house of quality filter materials at a savings. Next time, make it "FILPACO"; we can probably ship from stock.

Find out why so many paint manufacturers are "specifying FILPACO" Filter Paper and Cotton, Dynel, Viscon, Filyon, Nylon, Saran, Silk, Dacron, Glass Cloth, Felt, and other filtering materials. . .in rolls or cut and sewn to required shapes and sizes.

YOUR INQUIRY IS INVITED!

We manufacture a complete line of filters, filter materials, tanks, mixers and fillers.

FILPACO INDUSTRIES
THE FILTER PAPER CO.
2458 S. Michigan Avenue, Chicago 16, Illinois

Please...

When you change your home or company address . . .

Mail old address as shown on magazine wrapper plus new address directly to PVP four weeks prior to moving.

Please include the following information about yourself: Title, Company, Nature of Company's Business.

Subscription Dept.
Paint & Varnish Production
855 Ave. of the Americas
New York 1, N.Y.

UNION CARBIDE

The following personnel appointments were announced:

Herbert R. Clark from technical representative in Philadelphia to technical service specialist, Technical Service Department, Bound Brook, N. J.

Howard L. McCurdy from technical correspondent to technical sales representative in the South Atlantic Regional office at Moorestown, N. J.

Charles W. Naylor as a sales trainee in the Midwestern Regional Office at Chicago.

Douglas L. Peterson to the North Central Regional Office in Cleveland as technical representative trainee.

AMERICAN FELT

Harold Gray Hencken has been named Director of the Engineering and Research Division.

Mr. Hencken will be responsible for all technical activities of the company including basic research, new product development, technical services and customer engineering consultation. He will also have general supervision over the company's control laboratories in four plants located at Franklin, Mass.; Newburgh, N. Y.; Westerly, R. I. and Glenville, Conn.

H. G. Hencken

E. S. Ward

PENNSALT CHEMICALS

E. Smedley Ward, has been assigned to the New York territory. Before joining the firm in 1957, he was a sales representative for the Culf Oil Corp. in Philadelphia.

Homer B. Greetham will be serving aerosol contract loaders, aerosol vendors, and original manufacturers of refrigeration equipment in a territory which includes Ohio, northern Kentucky, and lower Michigan.

B. B. CHEMICAL

Franklin N. Ritschel, Jr. has been named a sales engineer for the company's line of urethane coatings. In this capacity he will be working on development and sales programs on coatings for wood, concrete and other surfaces.

AMERICAN ALKYD

Peter H. Heck, has been appointed Manager of Midwestern Operations.

In his newly created position, Mr. Heck will direct all sales and production for the company in the Chicago area.

HEYDEN CHEMICAL

T. H. Risch has been named field sales manager, and **G. T. Roberts** a product sales manager.

Mr. Risch, formerly product sales manager for organic intermediate chemicals, will be responsible for the division's ten district sales offices. Mr. Roberts has been the assistant group leader of the corporation's Applications Research Group. His new responsibility will cover the sales of synthetic resin chemicals.

Correction

VULCAN-ASSOCIATED CONTAINER COMPANIES, INC.

David W. Lynch has been named General Sales Manager and **Donald R. Hoover** appointed Assistant Sales Manager of Vulcan Associated Container Companies, Inc. Mr. Lynch will headquarter at the company's executive offices in Birmingham, Ala.; Mr. Hoover will have his office in Belwood, Ill.

These appointments were incorrectly stated in the May issue.

CLASSIFIED ADVERTISEMENTS

Rates: $.20 per word, except those seeking employment, for which rate is $.10 per word. Minimum: ten words. Address all replies to Box Number, c/o Paint and Varnish Production, 855 Avenue of the Americas, New York 1, New York.

RESIN KETTLES

2—3,000 gallon (18,000 lbs. Solid Charge), 7′ diameter by 10′. Stainless with turbine agitator, cooling coils. Reflux tank and condensors each with new never used Selas gas units or one Trent electric jacket. Excellent condition equipment being replaced with larger units by synthetic resin manufacturer. Write Box 3603.

PAINT CHEMIST WANTED

Leading New England supplier of raw materials has a position open for an experienced paint chemist. Write Box 660.

GOOD USED MACHINERY

1-Du Pont 5′ x 2′6″ Jacketed Ball Mill. 20 HP Ex Prf Motor
2-Abbe Engineering 4′ x 3′ porc. lined Pebble Mill. 5 HP Mtr & Drive
1-Patterson 3′ x 4′ Jacketed Ball Mill. 10 HP Expl. proof Motor
4-Heavy duty Paste Mixers, 250, 375 and 400 gallon capacities
1-J. H. Day 100 gallon Double Sigma Mixer. Jacketed heavy duty
2-J. H. Day 14″ x 32″ high speed 3 Roller Mills. 25-12½ HP
1-Kent 6″ x 14″ 3 Roll Hi Speed Mill. W/Motor and Drive
6-Sparkler Filters, Mod. VR-17-12, VR-17-6, and 14-D-4. W/Pumps

For any item you need, wire or phone collect GA 1-1380

ME MACHINERY AND EQUIPMENT COMPANY
123 Townsend St. · San Francisco 7, California

THE MOST DIVERSIFIED LINE OF MICAS STOCKED IN 24 CITIES

• BOSTON • NEW YORK • TRENTON • PHILADELPHIA
• BALTIMORE • AKRON • CLEVELAND • CINCINNATI
• LOUISVILLE • CHICAGO • ST. LOUIS • DES MOINES
• KANSAS CITY • TULSA • OKLAHOMA CITY • DALLAS
• HOUSTON • DENVER • SEATTLE • PORTLAND • SAN FRANCISCO • LOS ANGELES • TORONTO • MONTREAL

The English Mica Co.
RIDGEWAY CENTER BUILDING, STAMFORD, CONN

INDEX OF ADVERTISERS IN THIS ISSUE

Paul O. Abbé, Inc. ..... May
Alkydol Laboratories, Div. Reichhold Chemicals, Inc. 63
Allied Chemical Corp., General Chemical Div. ..... May
Allied Chemical Corp., National Aniline Div. 4
Allied Chemical Corp., Plastics & Coal Chemicals Div. ..... May
American Can Co. ..... May
American Cyanamid Co., Plastics & Resins Div. ..... May
American Felt Co. ..... 3rd Cover
American Optical Co. ..... May
American Tung Oil Assn. 100
American Zinc Institute ..... May
American Zinc Sales Co. 80
Antara Chemicals Div. of General Aniline & Film Corp. ..... May
Archer-Daniels-Midland Co. 14, 15
Atlas Electric Devices Co. 82
Baker Castor Oil Co. 24
Brighton Corp. 68
Buhler Bros. 78
Cargill, Inc. 32
Celanese Corp. of Amer., Chemical Div. 23
Cellofilm Industries ..... May
Arthur Colton Co. ..... May
Columbian Carbon Co. (Paint) 28
Commercial Solvents Corp. 42
Coors Porcelain Co. 79
Continental Can Co. 70
Davies Can Co. ..... May
Diamond Alkali Co. ..... May
Diamonite Products Mfg. Co. ..... May
Dianol Div., Mills-Pearson Corp. 103
Dow Chemical Co. ..... May
DuPont de Nemours & Co., Inc., E. I., Explosives Dept. 16
The Eagle-Picher Co. 18
Eastern States Petroleum & Chemical Co. ..... May
Eastman Chemical Products, Inc. 27, 53
Elgin Mfg. Co. ..... May
Emery Industries, Inc. ..... May
English Mica Co. 113
Enjay Chemical Co., A Div. of Humble Oil & Refining Co. 12, 13
Farnow, Inc. 83
Ferro Corp., Porcelain Div. 73
Filpaco Industries, Inc. 112
Foremost Food & Chemical Co., El Dorado Div. ..... May
Franklin Mineral Products Co. 104
General Dyestuff Co., Div. of General Aniline & Film Corp. ..... Insert 41
General Tire & Rubber Co., Chemical Div. 11
Georgia Kaolin Co. ..... May
Georgia Marble Co. ..... May
The Glidden Co., Chemicals-Metals-Pigments Div. ..... Insert 31
B. F. Goodrich Chemical Co. 107
Goodyear Tire & Rubber Co., Chemical Div. ..... Insert 19-22
Harshaw Chemical Co. 36
Hercules Powder Co., Naval Stores Dept. 54
Hercules Powder Co., Paper Makers Dept. ..... May
Hercules Powder Co., Va. Cellulose Dept. ..... May
Heyden Newport Chemical Corp. ..... May
Herman Hockmeyer & Co. 76
Imperial Color Chemical & Paper, Pigment Color Div., A Dept. of Hercules Powder Co., Inc. 90
Inland Paint & Chemical Co. ..... May
Inland Steel Co. ..... May
Instrument Development Laboratories, Inc. ..... May
Internatonal Talc Co. 30
Johns-Manville Corp. 25
Kentucky Color & Chemical Co., Subsidiary of Harshaw Chemical Co. 49
Karl Kiefer Machine Co. 92
H. Kohnstamm & Co., Inc. ..... May
Lake Engineering Co. ..... May
Lauderdale -Ruttgers 103
J. M. Lehmann Co., Inc. 8
Machinery & Equipment Co. 113
Marbon Chemical Div., Borg-Warner Corp. 6
McDanel Refractory Porcelain Co. 85
Mearl Corp. ..... May
Metalsalts Corp. 101
Metals Disintegrating Co. ..... May
Metasap Division—Nopco Chemical Co. 109
Mineral Pigments Corp. ..... May
Minnesota Linseed Oil Co. 40
Monsanto Chemical Co., Plastics Div. 38
Morse Chain Co., Div. Borg-Warner Corp. ..... May
Naftone, Inc. 60
National Lead Co. 66, 67, 87
New Jersey Zinc Co. 17
Newman-Green, Inc. ..... May
Newport Industries Co., Div. of Heyden Newport Chem. Corp. ..... May
Nopco Chemical Co. 89
Oronite Chemical Co. 50
Pacific Vegetable Oil Co. 26
Patterson Foundry & Machine Co. Div. of Ferro Corp. ..... May
Pennsalt Chemicals Corp. 98
Pennsylvania Industrial Chemical Corp. 94
Phillips Petroleum Co. ..... May
Pittsburgh Coke & Chemical Co. 56
Photovolt Co. 103
R-B-H Dispersions Co., Div. of Interchemical Corp. 88
Radiant Color Co. 102
Reichhold Chemicals, Inc. ..... 2nd Cover
Rohm & Haas Co., Resinous Products Div. 58
Chas. Ross & Sons Co., Inc. 84
St. Joseph Lead Co. ..... May
Sandoz, Inc. ..... May
The Sargent-Gerke Co. ..... May
Shawinigan Resins Corp. ..... May
Shell Chemical Co. 3
Shell Oil Co. 10
Sinclair Petrochemicals, Inc. 9
Skelly Oil Co., Industrial Div. ..... May
Skinner Engine Co., Troy Engine Div. ..... 4th Cover
Southern Clays, Inc. 73
Spencer Kellogg & Sons, Inc. 29
Sprayon Products, Inc. ..... May
Titanium Pigment Corp. 57
Union Carbide Corp., Silicones Div. 91
Unit Process Assemblies, Inc. 104
U. S. Stoneware Co. 77
R. T. Vanderbilt Co., Inc. 86
Velsicol Chemical Corp. 55
Vulcan Containers, Inc. 74
Vulcan Steel Container Co. ..... Front Cover
C. K. Williams & Co. ..... May
Witco Chemical Co. 64
Wyandotte Chemicals Corp., Michigan Alkali Div. 105

Order Reprints Today from PVP

Photo by Fenten

Use Coupon Below

Enter quantity of reprints desired in appropriate box, and return coupon to *Paint & Varnish Production*, 855 Avenue of the Americas, New York 1, N. Y.

- ☐ **Properties of Phthalocyanine Pigments** by Harold T. Lacey, George L. Roberts and Vito A. Giambalvo—**75c**
- ☐ **Glycerine Alkyds** by N. P. Barr—**75c**
- ☐ **Outdoor Exposure of Acrylic Emulsion Paints** by Gerould Allyn—**75c**
- ☐ **Liquid Polybutadiene in Surface Coating** by J. A. Shotton and C. W. Wolfe—**50c**
- ☐ **Dispersibility of Aluminum Silicates vs. Magnesium Silicates in Zinc Chromate Primers** by Dr. William R. Eubank—**50c**
- ☐ **Isocyanate Resins for Coatings**—Part I—**$1.25**
- ☐ **Problems in the Finishing of Automobiles** by Ralph J. Wirshing and Wardley D. McMaster—**50c**
- ☐ **What to Look for in Used Lift Trucks** by R. F. Moody—**50c**

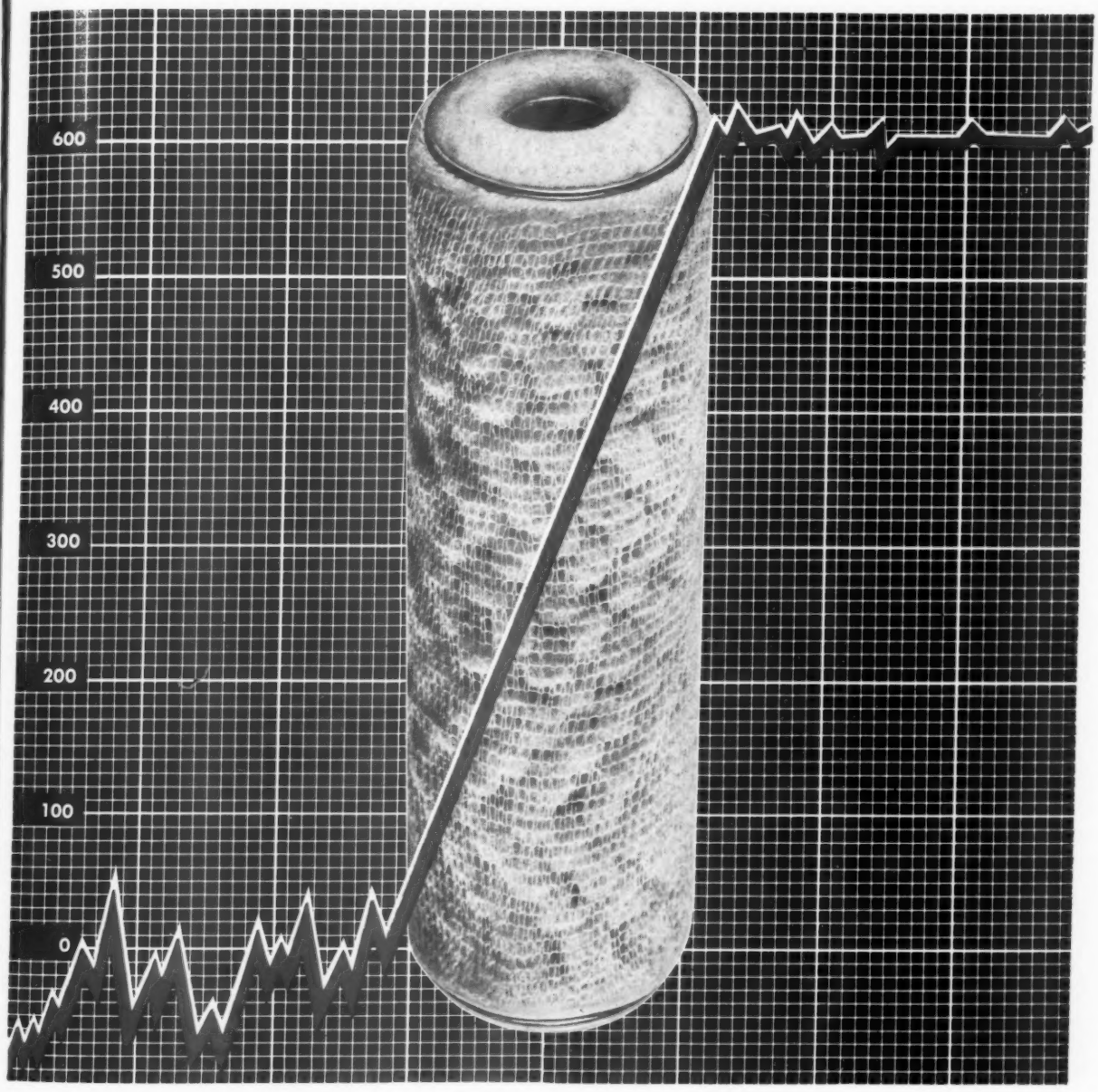
Name .....

Company .....

Address .....

City ..... State .....

☐ Remittance Enclosed ☐ Bill Me 660



Performance records climb with new AFCO "Feutron"® cartridge!

This sensational *new* filter cartridge will out-perform your present cartridges. An exclusive construction plus precision-controlled materials make the important difference.

The AFCO "Feutron" cartridge is manufactured from all-new, custom-engineered fibers of consistent denier, to a controlled, *consistent* density and texture. This means top efficiency, performance economy and uniform particle retention in filtering impurities from all types of liquids and gases.

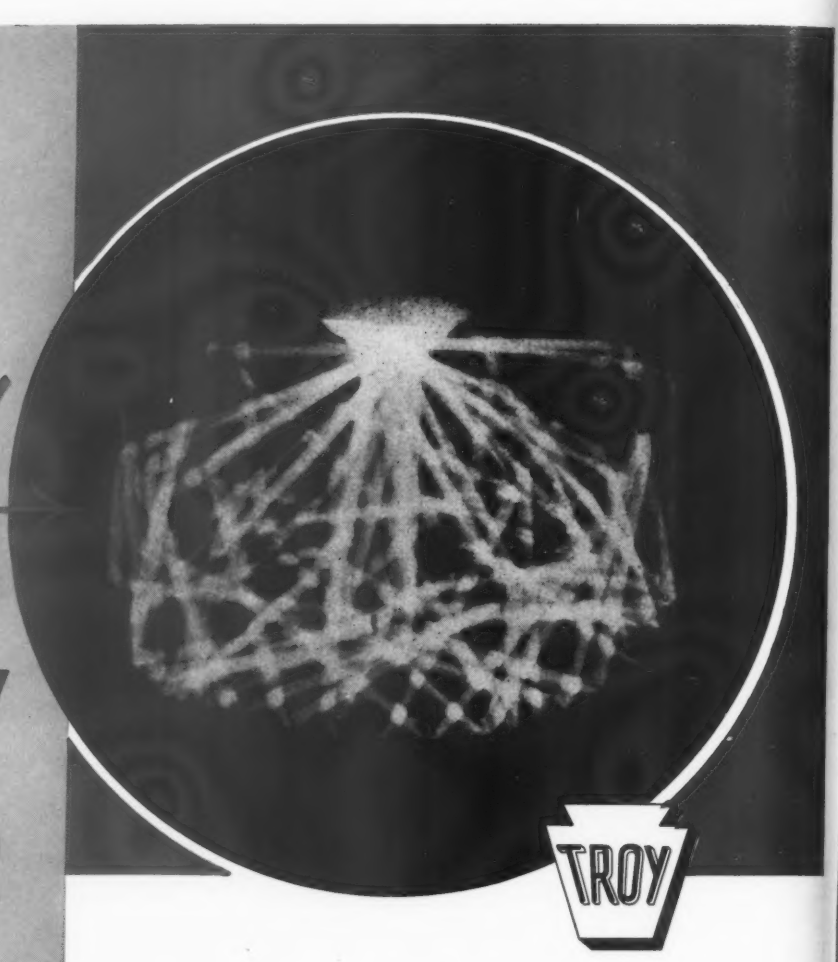
Faster flow . . . higher solids capacity . . . and dependable uniformity in the filtrate will send your filter performance records soaring above previous norms.

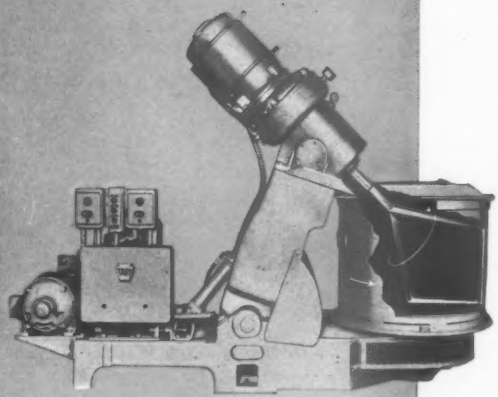
We can supply AFCO "Feutron" filter cartridges to fit your present equipment exactly. A letter from you will bring full technical information by return mail.

American Felt Company

OVER 60 YEARS OF FILTRATION EXPERIENCE

SHEARING
KNEADING
MULLING
ACTION
WITH
TROY
ANGULAR MIXERS





ANGULAR MIXER
60-Gallon size illustrated

The powerful, three-dimensional, TROY action comes alive in this unretouched stroboscopic photograph. With this action, no dry build-up occurs and no scraper is required since the faces of the revolving can are used as working surfaces. Simultaneous vertical and horizontal angular motion rotates and intermingles sheared and mulled solids into a true mixture for fine consistency. Separate single, or two-speed gear motors drive turntable and agitator to give variable mulling and shear ratio on the tank working surfaces.

The results....lower production costs through material that is thoroughly mixed, dispersed and blended in a smooth finished, homogeneous batch — eliminating extra processing in many cases.

SECO
ESTABLISHED 1868

TROY DIVISION
SKINNER ENGINE COMPANY, ERIE, PA.
Telephone: GLendale 2-3661